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ABSTRACT

This document includes six papers presented at the conference. Raymond T. Affleck, in a concluding address, enlarges the general theme of the conference to "Learning Environments - Why, What, How?". James A. Gibson, in "Every Man His Own Architect," says that school planners should possess the characteristics of an architect who looks around him and brings to his immediate tasks a wide experience of men and things, sensitivity and judgment, and the capacity to encourage others to their best efforts. Stewart C. Mason's speech, "In Our Experience," concerns the history and current development of education in Leicestershire, England. Alfred Roth, in "Better Schools for Progressive Education," discusses the present state and development of school building; and David A. A. Stager, in "An Economist's View of Schools and Schooling," discusses productivity and efficiency, financing, and programs. Cicely Watson, in "Specifying Future Educational Needs in a Changing Political Climate," outlines some of the problems inherent in balancing educational needs with economic and political conditions. (MLF)

ED 063653

REPORT OF THE CONFERENCE ON SCHOOL BUILDING

Why What and How?

EA 004 325

WINTERS COLLEGE
York Campus / York University
MAY 18-21, 1971

ASSOCIATED ORGANIZATIONS

Association of Consulting Engineers of Canada
Association of Professional Engineers of Ontario
Canadian Construction Association
Canadian Council of Professional Engineers
Canadian School Trustees' Association
Ontario Association of Architects
Ontario Association of Education Officials
Ontario Association of School Business Officials
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SCHOOL BUILDING - Why, What and How?

The Conference - "School Building - Why, What and How?" was held at York University, May 18-21, 1971. As the representative of The Centre for Continuing Education at the University and conference co-ordinator, I welcome the opportunity to express my appreciation to the many committee members and organizations who contributed so generously of their time and talent to make the conference a success. On behalf of the Advisory Committee, our sincere thanks also to the many group discussion moderators and resource personnel who are so necessary to make any conference fully useful and interesting.

The project was planned on an international level. The proceedings will provide a permanent record of the many outstanding papers delivered. So much valuable material was presented, that it warrants preservation. Perhaps they will serve as a spur and model for a similar conference in the future.

Dr. N. B. Baird, Chairman,
Special Studies in Education,
Conference Co-ordinator.

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LEARNING ENVIRONMENTS - Why, What, How?

by

Raymond T. Affleck

In thinking about the issue of a "wind-up" address, I decided to return to the general theme of the conference for the content of my address. Rather than confining myself, however, to specific questions about school buildings, I have decided to enlarge to scope to the Why, What and How of Learning Environments in general.

I make no claims to answering any specific questions about schools or education, - the questioning mode is used rather as a style of enquiry that permits and enhances speculation and probes in contrast to a style that pretends to provide firm answers or proof.

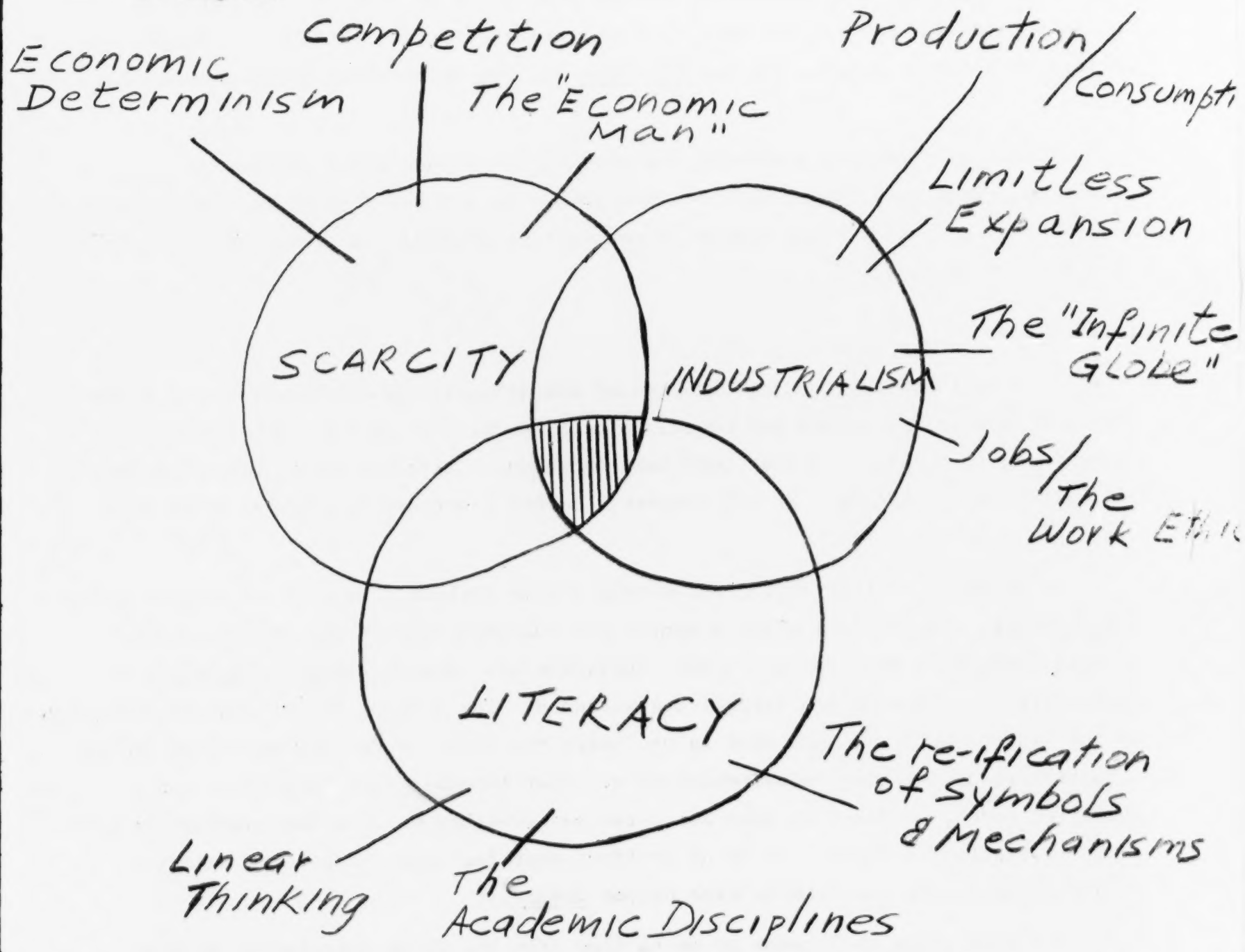
1) Why?

In most societies a major function of education is the socialization of young people to the norms, values and behaviour patterns of that particular society. It seems to me that this is a most important function, - although by no means the only one performed by schools. It is, however, the one I propose to examine under the heading Why?

It seems to me that during relatively stable periods this role of socialization (programming, preparation) plays a useful and valuable role in any society. The process works well when values, norms, behaviour are largely taken for granted, - when social assumptions are largely unquestioned. The paradox of our present situation in the Western World is that this is no longer the case. - We find ourselves in the situation of an emerging value/behaviour set that fundamentally challenges our inherited model. - Hence we must ask ourselves (whether we like the question or not) - "Socialization to What?" It is no accident that for many, if not the majority, of our young people our Schools have become absurd.

The main issue that seems to me to flow from the above speculation is that we must now attempt to re-establish (re-discover, re-search) a fit between the process of learning and the new patterns of values and life styles now emerging throughout the developed world.

I happen to believe that the changes we are now living through are profound (possibly the most thoroughgoing social change since the time of the Renaissance). If we hope to achieve again any kind of fit between form and function in the learning process, then equally profound changes in our understanding and action are required in this area. In order to communicate some of my thoughts and intuitions about this question of <u>fit</u> in learning environments, I suggest that we examine the following two diagrams.



<u>The Inherited Model</u>
(The invisible environment of most present-day schools)

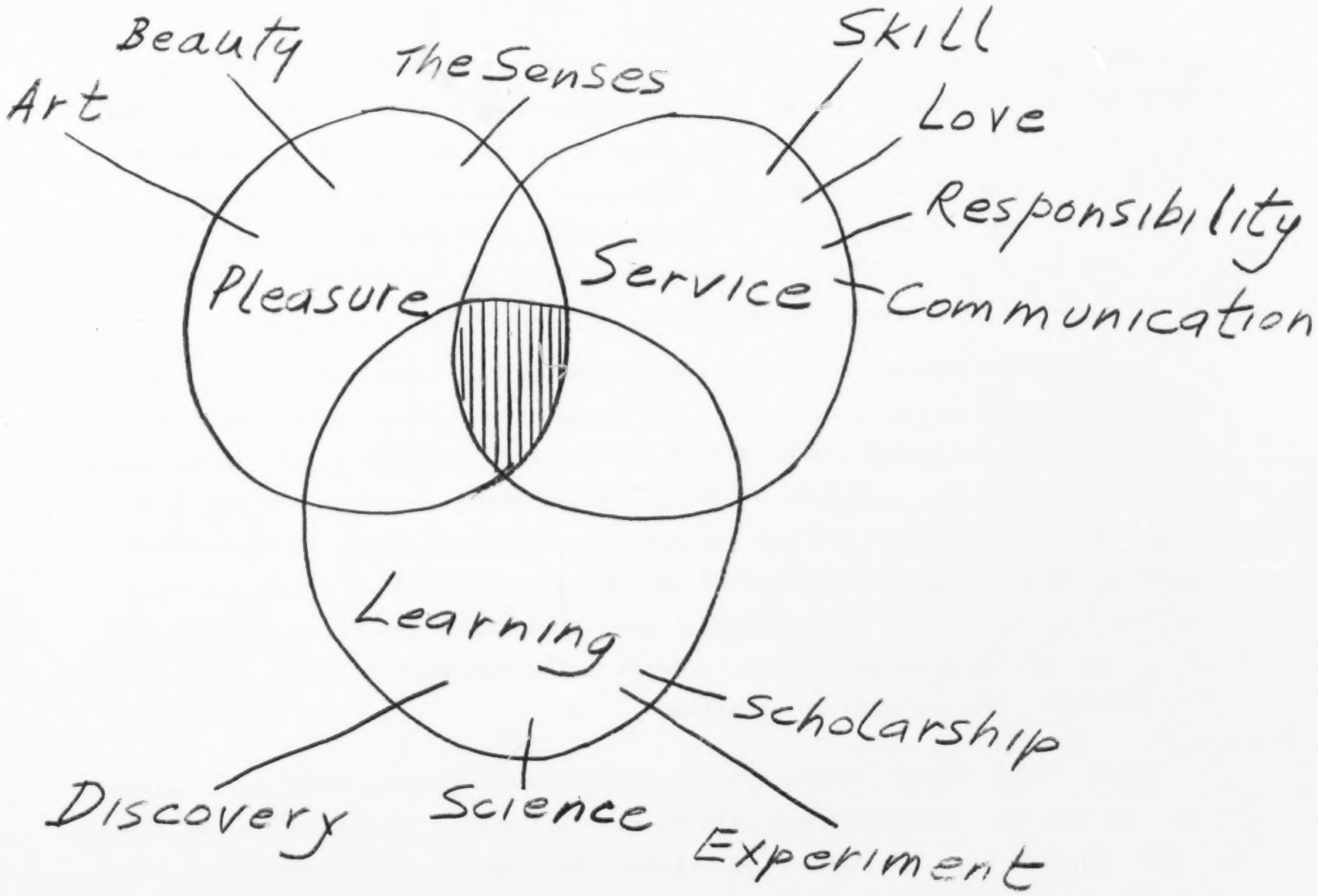
This diagram attempts to bring into conscious focus the set of values and

assumptions that have until recently been taken for granted in our society (and by corollary in our schools). One way of expressing our current condition is that we are rapidly "going beyond" or transcending these values. Scarcity has become post-scarcity - the phenomenon has not disappeard - it has been transformed. To-day our two most pressing scarcities are psychic scarcity and natural scarcities (space, air, water etc.) The fact the material scarcity continues to be artificially maintained serves to obscure the real nature of this crisis.

The inappropriateness of our assumptions about the industrial system are equally clear. The frantic cycle of production and consumption is now confronted with fundamental questions about the nature of man's work. In place of the crude exploitation of nature and the limitless production of hardware, work now emerges as a concern for our environment and our own humanity, - including the blunt issue of survival as well as the complexities of improving the quality of life. As these changes in our concepts of work develop, naive assumptions about the "one to one" relationship between work and income, or work and environment begin to lose their old hold on our conciousness and behaviour.

The conflict between an educational establishment firmly committed to literacy and a constituency now well into a culture that is largely post-literate has already been well documented. The continuing boredom, frustration and busywork that still characterize so much of our school environments can be largely attributed to a critical lack of fit in this area of communication.

If the diagram communicates at least partially one serious area of mis-fit, it also raises the question of what might constitute a better relationship between assumptions and action in the learning environments of the present and future. The diagram on the next page is presented as a tentative contribution to this emerging consciousness.



2) What?

In considering the question of What with respect to learning environments two main models emerged in my thinking. These could be called the "No-Place" school and the "Place" school. The former model recognizes the role of the total environment in learning, and calls into question the notion of the school building as a place set aside from everyday life and experience. It sees learning in terms of "demand media" and relies heavily on the omni-presence of advanced technology, particularly in the fields of information, memory and communication.

While I accept the general validity of the "No-Place" model I do not feel that it replaces the significance of a "sense of place" in the learning experience. Rather this sense is transformed and re-inforced, - moving away from the Factory/ Production model of the school towards a concept of place that stresses psychic and sensual rather than material values. This speculation points in the direction of analogues such as "home", "living-room", "village square" as models for that part

of the learning environment that would provide security, warmth, continuity and emotional support.

In addition to these general environmental qualities other very specific places might be required to provide opportunities lacking or rarely found in the contemporary world. Examples of these special-type environments would be quiet places, places for meditation and contemplation. The deliberate preservation of wilderness areas or of specific historical environments are also examples of a particular place-orientation in the learning process. Special places such as these would reinforce general learning in the "school without walls" by providing the necessary home base, point of return and place with a "sense of belonging".

3) How?

As in the question of What, the question of How to develop more appropriate learning environments suggests to me that there are two main avenues of approach. These consist of:

1) 1) Working within the existing institutional network, or
   2) Inventing and implementing new social mechanisms

The aim of both these modes of intervention is, of course, a radical transformation of existing institutions.

Educational organizations as they now exist provide great opportunities for innovation: - The breaking down of rigid bureaucracies - the introduction of decentralized decision-making and responsibility at the level of the small group - the re-cycling of existing school buildings away from a mechanical model and in the direction of a human one.

The challenge of developing alternative learning environments outside of existing social structures provides an equally compelling challenge.

Current experiments in Communes, Free Schools, Open Universities provide examples of both the difficulties and the value of such an approach.

The quick change and rapid rise and fall of most experiments of this nature suggests that the notion of institutional permanence itself may be inappropriate to the emerging post-industrial world. Another phenomenon that seems to appear frequently in such experiments is the emergence of particularly strenuous and demanding human inter-relations. - The abandonment of time-worn mechanical restraints (of time, role, status, domination etc.) does make demands on inter-human relationships that

we are generally ill-prepared to meet. The active articulation of these challenges is possibly one of the most important current roles of experimental learning environments.

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EVERY MAN HIS OWN ARCHITECT

by

James A. Gibson

The title of my remarks is a title not intended to put all the professional architects out of business, any more than any alternative title - Every Man his Own Doctor, Lawyer, Banker, Management Consultant - would imply displacing those professionally-trained and important participants in organized society and our everyday life.

I am thinking, rather, of the architect as some one who, in the Christopher Wren tradition, looks around him and brings to his immediate tasks wide experience of men and things, sensitivity and judgment, and the capacity to encourage others to the best efforts of which each individual is capable.

We do not have many individuals today in a direct Wren tradition, though we live in a much-different world. Imagine a mathematician and skilled geometer who, in his student days, continued in a luminous British tradition of anatomy and experimental medicine; who, within the lifetime of William Harvey, Thomas Willis, Charles Scarbrugh and William Croone, was a pioneer of the techniques of intravenous injection and renowned as an author and illustrator of surgical procedures. Imagine the developing architect who, designing the Sheldonian Theatre in Oxford on commission from his archepiscopal uncle, later designed everything from sundials to City churches, and was to reach the crowning glory of St. Paul's Cathedral. It was not of his doing that imaginative outlines for the orderly rebuilding of London after the Great Fire were evaded and flouted; it is only a tragic irony that on the morrow of a frightening holocaust from the air, opportunity was provided, nearly 300 years in arrears, for reshaping the ancient city in terms of light and air and living-space. One may add that Wren was one of the original members of the Royal Society; and he had a distant if interested connection with 17th century Canada as an early proprietor in, and briefly as Governor of, the Hudson's Bay Company.

I am thinking also of architects (by my definition) against the background of one main emphasis. That emphasis is to create things of visible substance, of lasting beauty, and, one may hope, of cultural importance in a society nowadays technologically

vigorous, progressively conditioned to the notion of "systems" as a supposed badge of "efficiency", and which increasingly draws upon skills of innovation, adaptability and productivity.

These may well be words which would not have entered into the vocabulary of Wren and his contemporaries. They lived in an age of craftsmen rather than of mass-production. They never were to see steam trains or steam vessels, or diesel engines or jet aircraft. They knew of no products of nuclear fission, and there were chemical elements and biological syntheses not then discovered. But they talked of the day when men might readily walk on the moon (sometimes they spelled it Moone); and their vision must clearly have been of and for the future.

The vocation of architect has embraced many singular men and women. I recall with affection the first professional architect I ever saw at work. He had come around Cape Horn in a sailing vessel; he was rosy-cheeked, soft-spoken, and faintly Dickensian in mood and bearing. The great work of his life was to make a cathedral - a structure in stone to replace an earlier edifice built from timber hewn on the site; and when a robin built a nest on a column before it had been capped off, he halted the work until the nesting season was over, and made with his own hands a plaque for what is still called The Robin's Column.

I once worked (as a statistical investigator) for an architect who wrote two little books still referred to: "The Things which are Seen", and "Good and Bad Manners in Architecture". He had taken a double-first at Oxford and was a founder of the Nietsche Society. He served in the lower deck of destroyers in the first World War, keeping the confidential wardroom books, and storing-up recollections which emerged in print in a best-seller called "Three Rows of Tape". He forsook the Ministry of Health to embark on a campaign to build in Britain fifty entirely new towns (the concept has taken hold, though the number still falls short of his target). He used his service number as a pseudonym; and one brisk day, wearing his leading seaman's jersey and carrying a huge Union Jack, he led a procession of service veterans from Tower Hill to Trafalgar Square to call attention to his favourite project. One of his favourite jingles, and one perhaps savouring as much of truth as of poetry, was taken from a review in Punch of a little book on Village England by Sir W. Hicks-Thomas; it went something like this:

I hope his book may urge and grow
On all who live in, or have planned
Some Jerry-Builders Jericho
In England's green and pleasant land

Now you may say that these architects are far-removed from the Changing Objectives of the Educational System and their Relation to Economic and Social Needs. This topic has been announced for Discussion Group No. 1 (a topic to which some of you will be addressing yourselves tomorrow.) But they, equally with my architects for 1971 and for the future, are like those described in the Hymnal:

> All are architects of fate
> Working in these walls of time
> Some with massive deeds and great,
> Some with ornaments of rhyme.

Let me move from these observations to some of the Changing Objectives within the educational system as I discern them. The men I have been describing no doubt would be regarded as an élite; they were a minority among their fellows; they had enjoyed opportunities to which their native capabilities and their assiduous industry had responded, and, speaking generally, they had improved their opportunities.

In our English-speaking societies, at some point in time, and one which I have never accurately determined (though I fancy it was perhaps 135 years ago) the entire focus and concept of educational opportunity began to change. Literacy (or illiteracy) were no longer to be a badge of class. Some of the archaic restraints on books and periodicals (by way of stamp duties and otherwise) were removed. "Mechanics Institutes" and "Free Libraries" were founded. In Britain the outworn basis of Parliamentary representation gave way before many popular demonstrations and reform began, to be followed by the abolition of slavery throughout the British realms and the passing of the first factory act. The first Municipal Corporations Act, and the founding of new universities outside the somewhat weather-beaten monopoly and privilege of Oxford and Cambridge were further parts of the process of change.

> "In this dynamic age, it was not easy to be wise.....It was the men of sober judgment who tended to become bewildered pessimists and the men of crude imagination and young inventive minds who felt at home.....".[1]

It was against this background that two facets of public education began to emerge in a very striking way.

The one was that it was <u>public</u>; that is, it was to be open to everyone within a certain span of age; it was to be a charge upon publicly-contributed funds; the training of teachers was to become a public enterprise, and the shaping of the

curriculum was to become, by stages, a public (almost legislative) concern rather than a private monopoly.

The other facet was that education now becoming public was also becoming an urban phenomena, a function of an increasing proportion of an entire population living as city-dwellers employed in an urban-centred economy. It is this urban (not to say regional or metropolitan) orientation which has been a consistent thread in the requirements of public education in Canada for upwards of 70 years. I shall return to this thread in a moment, and to the spiral of urgent requirements which surround it.

In the British context, the relationship to economic and social needs was never more graphically portrayed than by Charles Dickens, who was almost the first of the novelists of and about the urban city. One hundred years after his death, it is (as Professor Steven Marcus has suggested)[2] possible to read and re-read Dickens "with an enthusiasm, amazement, intensity, bafflement and enraptured interest that are in their own way quite comparable to the responses expressed by Dickens' own original audiences". In his own lifetime - an age that numbered citizens of the stamp of Edwin Chadwick, Charles Babbage, Charles Darwin and Florence Nightingale, Dickens had become an expert on urban life; "on social change within the city; on the myriad trades and professions and institutions through which a city's existence is maintained, and on how such groups along with other populations distribute themselves in neighbourhoods and enclaves within the structure of urban space".[3]

I wonder whether my listeners - being professionally concerned with some aspect of school building - would not agree that this still is the background against which the requirements and the equipment of public education must be worked out, and that it is basically within this context that the evaluating of economic and social change must take place?

The background I have been describing stems from British experience. Into our Canadian experience some of this British experience was translated. Some of it, no doubt, was a reaction against a threat of progressive "Americanization" as it was perceived in the 1840s and 1850s; though these same decades saw perhaps the easiest coming and going across an international boundary, and more intermingling of families on both sides, than has happened since. There was indeed a considerable community of education: the experience of my grandmother may have been matched many times. She went to school alternately in Morrisburg, Ontario, and Waddington, New York (older

married sisters living in both communities). At age 16, her good character being attested to alike by the Anglican incumbent and the Presbyterian Minister - she was later to be married in "the Methodist persuasion" - and being able to read well and to write clearly (which she still was able to do on the eve of her 99th year) she was at age 16 appointed to teach school along the St.Lawrence shore now inundated by Seaway development. There may have been better models, though not many, of populist democracy operating through local boards of trustees even for ungraded schools of one room. The coalescing of multiple small boards into multi-member county or regional boards with expert staff services and sophisticated equipment is no doubt a sign of the times; and no doubt it is designed to ensure the most effective use of skilled resources for the largest possible number of students. But if this coalescing loses sight of, or glosses over, the intensely personal character of education as an amalgam of the trust, confidence, spirit and substance which the good teacher inspires and radiates on the one side, and the eager curiosity and sense of wonder on the other side which even the conformistic tyranny of some parts of "the mass media" cannot entirely subdue, it will fail in any objective of certainty and of satisfaction. It would be a disaster if the notion of some qualitative opportunity for education should suffer the tyranny of a system in which value for the taxpayer's money were to be esteemed more highly than the variant growth of individual human beings.

I promised to come back to the urgent requirements of what I called the urban orientation of a great segment of our public education.

I can best illustrate my point by reference to an important case-study. A recent statement on Education for the Urban Disadvantaged from Preschool to Employment[4] deals with conditions in the United States, but many of the insights will have an applicability to Canada, and specifically to Urban Canada, precisely because of the concentration of over 80% of the whole population in communities described as urban.

This report says that while schools in the United States

> have generally provided middle-and upper-income youth with the intellectual tools necessary for success in our society, they have commonly failed to cope effectively with the task of educating the disadvantaged youth in our urban centres..... as technology absorbs the tasks of unskilled workers, the chasm between the poor with inadequate schooling and the remainder of society is widening at a rapid rate. Even where unskilled jobs remain, they are frequently inaccessible to the poor of our central cities.

The authors explain that "disadvantaged" as a term applies to those persons whose economic status is not above a "poverty threshold" based on annual income.[5]

The individuals to be provided for - this would apply in any region, but it applies especially in large urban centres - are those described as lacking "functional literacy", access to employment, decent incomes, and other necessities for a satisfying life. Their goals, as society's goals overall, include freedom from hunger and pestilence and a fair share of the benefits of the Larger Society. To remove the causes of poverty, hunger, pestilence, and of many kinds of unemployment will - as we now generally recognize - require a massive, continuing change in the quality of the environment in which we live. It is staggering enough to realize that though the poor in the United States represent 13% of the population, in absolute numbers they exceed the whole population of Canada.

The mechanics of contributing to the quality of the environment embrace many requirements: three of the most obvious, perhaps, are the providing of training and jobs for marginal workers; a review of the entire health-care program; and coming to grips with the financing of the housing needs of the nation.

No single application of any one of these "mechanics" will answer the overall problem, nor of itself cope with the continuing problem of drop-outs from secondary schools. But public policy in education may assume a renewed importance as a basic equalizing force: equalizing in the sense of "levelling-up" rather than of "grinding down". Public education once played a primary role in the assimilation into citizenship of hundreds of thousands of people not native to this continent. The counterpart in 1971 and succeeding years perhaps should be a new intensification of the quality of achievement by students in skills, knowledge, creativity; and by vigour in action.

It needs to be said - and this is something well within the experience of many members of this Conference - that increased expenditures will not of themselves guarantee improved education. When high effectiveness in instruction and in everyday operating efficiency are evidently within our reach, we should be vigilant lest money alone should help to perpetuate ineffective instructional methods and inefficient or unsatisfying administration.

I cannot here specify all the things which I think need to be done in Canada, but I can make two or three suggestions which I think would deserve consideration.

(1) I think there may need to be widespread transformations in "conventional" methods of financing school systems; and even though the concept of equality of educational opportunity may require high expenditures in "disadvantaged" areas, central-city schools should not be expected to operate with less money-per-pupil than some suburban counterparts. Though it is not a popular view in our present political climate, I would like to see a "federal presence" re-activated to provide deliberate assistance to programs of technical and technological training at appropriate levels for future urban employment and employability. At the same time I would like to see a revival of federal support for training in scientific agriculture (including conservation, land use, marketing and co-operative organization), a procedure in which the schools would become, or continue to be, the focus of a sense of community which no part of Canada should be allowed to lose.

(2) The changing character, and the changing locale, of the school population will require great flexibility in the design of school premises under whatever name; for in addition to entirely new structures there will have to be adapting or re-building of many existing structures. If school buildings still are to provide a sense of community they must become a central part of urban redevelopment, in which some mark of flexibility must set them from the repetitive sameness which has marked some approaches to new housing (the kind of housing which scarcely satisfies the sense of re-development).

The systems approach to school building has many attractions; I would hope that it would be the servant and not the master. The attractions include ease and speed of construction, and adaptability within walls. If systems-construction is to be linked to formula financing, care will have to be taken lest square feet per occupant and wxyz dollars per net assignable square foot become the over-riding considerations. The cost factor must clearly be a guideline; but it should not rule out full sway for imaginativeness in design, materials, colour; and artistic embellishment as something which is only "added on".

The urban requirements may impel planners to convert and refurbish facilities not originally designed for school purposes. In recent years in our own province we have seen interesting examples of colleges of applied arts and technology, and universities, making effective use of buildings taken-over and converted. The building in which Brock University began classes "under its own roof" originally housed a manufacturing plant in unzoned space. Abandoned, it was in danger of becoming an

eyesore and a target for vandalism; refurbished (in this case with direct grants for the purpose) at a cost of one-fifth of new construction, it became an anchor for an extensive new development of housing; it is expected to have many years of useful service.

(3) The facilities which public authority provides will fall short of visual expectations if the teachers and the teachers of teachers to be involved do not respond to wide-ranging contemporary insights. The able teacher, by definition, belongs to a dedicated calling. If public authority encourages the training of teachers for special and specialized tasks, the public conscience should underline the sense of commitment to tasks of sensitivity, patience and unlimited resource. In addition to teaching for the disadvantaged, we shall probably find ourselves devoting still more attention to teaching for the perceptually-handicapped. Overall, we shall need even more innovation and experiment; underlying all these requirements, we shall need unremitting hard work. We ought to hear less badgering about "frills"; if we want better educational fare, better cultural resource; more adequate defences against the crassness of some parts of the mass media; richer human satisfactions in the end, we shall have to be prepared to pay for it.

Let me come back to Every Man His Own Architect.

In my experience as a University President (which now is approaching eight years, after 12 years as Dean of a Faculty of Arts and Sciences,) I have come to make up my own private reckoning of some of the desirable components which go into this influential, demanding, rewarding, and not always visibly or audibly sought after office. By this reckoning I would include the President of an entirely new University as

27% Architect and Master Planner
16% Plain Good Listener
12% Champion Persuader of Committees
9% Principal Grumbler about Incipient Untidiness
8% Local Historian and Antiquary
7% Patron of the Arts
6% Solicitor and Examiner for Discovery
5% Principal Conservator of Trees
4% Furniture Testing Agent
3% Legislative Lobbyist
3% Miscellaneous, n.o.p.

Note, if you will, that I have not included any figure for Quantity Surveyor, or Contract Manager; but note also that I put the architect first. There has to be

a plan; a concept that can be given architectural shape and viable function.

Finally, it is a sound rule to be able to work from reasonable models. Four happy years of my academic life were spent at New College, Oxford; founded in 1379 by William of Wykeham, Bishop of Winchester, Surveyor of Windsor Castle, and sometime Lord High Chancellor under Richard II. In a turbulent age he was concerned that "there should never be lacking a sufficiency of Godly men for the service of church and state". He founded in Oxford a college, then as now called New College, because it was new in concept, new in buildings, new in the provisions of its statutes, for all of which the Founder was responsible. The original buildings occupied between 1386 and 1402, still are used substantially for the purposes for which they were designed; the Chapel and the Hall, sharing a single roof-line, were themselves a model for many later collegiate foundations; the Statutes, drafted by Wykeham himself, were detailed but not disabling. One crowning touch, and one undimmed by nearly 600 years of change (whether of rebellion, civil strife, parliamentary reform, industrial sprawl) was in the motto which the founder himself conferred: Manners Makyth Man.

I think this might not be a bad motto as we approach all our concerns for the future.

****

FOOTNOTES

1. K.N. Bell and W.P. Morrell: Select Documents of British Colonial Policy, 1830-1860 (Oxford 1928)

2. Steven Marcus, Dickens after 100 years, New York Times Book Review, June 7, 1970, 1,47-48.

3. Marcus, above, p. 48

3A. G.K. Chesterton, Robert Browning, (London, 1961), p.16

4. Research and Policy Committee of the Committee for Economic Development, New York, March 1971.

5. The 1970 adjusted figure, U.S., is estimated at $3,950, Report, p.83

Dr. James A. Gibson,
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IN OUR EXPERIENCE

by

Stewart C. Mason

Mr. Stewart Mason explained the extent to which the administration of education in England and Wales is delegated to 166 local education authorities. Each local education authority is able to decide the broad structure or stages of education in its area while questions of curriculum are the province of each individual school. This decentralisation is resulting in a wide variety of patterns coming into operation. Some people feel that this freedom is leading to a chaotic multiplicity of patterns but on the other hand the emphasis on local initiative does provide a climate favourable to innovation. Because of this great variety Mr. Mason explained that he would restrict his remarks and illustrations to the pattern and methods adopted in Leicestershire.

Under the 1944 Act compulsory education at primary level covered the age ranges 5 - 11+ and secondary education continued thereafter. Education at secondary level was selective, a small proportion of the ablest pupils going to grammar school, the remainder to the so-called secondary modern schools, which developed out of the pre-war senior elementary schools. The proportion of children going to grammar schools varied from one authority to another but in Leicestershire was 25%. In order to decide which children should go to the grammar schools, authorities operated an examination in the last year of the primary school, which became to be known generally as the '11+'. In 1944 there was general confidence in the predictive accuracy of standardised tests but as the years went by it became increasingly apparent that many other factors, not susceptible to objective measurement, undermined the validity of the 11+ examination. Even more important, the selective system was increasingly seen to be a denial of equality of educational opportunity and a source of bitter social dissatisfaction. A number of education authorities, where the opportunity occurred, e.g. in connection with large new housing estates, did begin to build comprehensive schools intended to take all the children from a given catchment area from 11+ upwards, irrespective of their intellectual level. It was however considered that in order to get sufficient numbers to provide an adequate variety of courses, at the senior end of the school, i.e. for pupils

between the age of 16 - 18 years, such schools would have to be very large schools (very large as seen through English eyes) i.e. of the order of 2000. Since school building in England, since the war, has been rigidly rationed by the central government, changing over from selective to comprehensive education in this way looked like being a very slow business.

In 1957 Leicestershire pioneered (so far as England was concerned) an approach to comprehensive education which would enable the changeover to take place much more rapidly and also to avoid the necessity for very large schools. The authority decided, in broad terms, to divide secondary education into two tiers, 11 - 14 years and 14 - 18 years. This enabled the authority to use the existing plant and at the same time to avoid the very large schools which engendered in many people's minds misgivings in regard to pastoral care. The county's secondary modern schools became the middle schools, having the age range 11 - 14 years and the selective grammar schools became the comprehensive upper schools, dealing with pupils from 14+ upwards. The change-over was accomplished gradually as circumstances permitted but by 1969 the new system covered the whole county and Leicestershire became the first English county to be wholly re-organised into a comprehensive system.

As the system has been evolving, so have ideas about it and various modifications have taken place of which the two most important were mentioned. The authority had remained satisfied of the advantage of keeping schools for pupils under the age of 14 of medium size. The middle schools in Leicestershire do not normally exceed 750 pupils. However at upper school level the authority had come to the conclusion that the older pupils, who may be regarded in many ways as young adults, are less likely to be overwhelmed by size. At this level a wide variety of facilities becomes much more important and consequently Leicestershire upper schools are being now conceived as schools for 1500 or so. As the population in the county is rapidly growing, it is proving possible to enlarge the existing upper schools to this kind of size. The second modification results from recent amendments to the 1944 Education Act which enabled middle schools to straddle the previous canyon which existed between primary and secondary education at the age of 11+. The authority has begun gradually to move towards a four year middle school by transferring children from the first stage at 10 instead of 11.

Mr. Mason then gave a brief account of how school building has been rationed and controlled by the central government. New school buildings or major additions to existing schools cannot be undertaken without permission of the Ministry of Education. (The Ministry of Education became The Department of Education and Science in 1964.) The Government decides the total value of capital expenditure for school building each year and this is then divided according to the Ministry of Education's judgment of the needs of the various local education authorities. Hitherto apart from a small amount for the replacement of the very worst schools, virtually the total amount has been channelled to what is termed 'basic need', that is to provide additional places for the increase in child population. School building is further controlled by building regulations imposed by the Ministry of Education under which minimum standards have to be achieved within a maximum cost. The formula for arriving at the maximum cost is a complicated one, depending upon the number and ages of children for whom the school is built. There has been since the operation of the formula steady pressure by the Ministry to reduce the maximum cost. This has forced educational administrators and architects to use their ingenuity in getting value for money, the main objective being to increase the proportion of a building available for teaching or learning, at the expense of 'circulation' areas. Many architects and educationists feel that the continuous squeeze has gone beyond the point of economic return, and that saving on initial expenditure will bring in its train excessive maintenance problems.

The minimum standards which the Ministry of Education have laid down were in the early days very specific. For example the size and type of individual spaces in schools were to a large extent prescribed. As the building regulations have been revised from time to time, they have progressively allowed education authorities greater discretion and at the moment have reached the stage where total teaching area is laid down rather than individual spaces. The regulations also prescribe the number of sanitary fittings, hard-paved play areas, size of sites, etc. according to the size and type of school, also such things as ventilation, heating and lighting standards. The most restricting prescription has been the demand of a 2% day-light factor throughout each teaching space. This has tended to encourage the building of schools with walls of glass, providing glare and discomfort in the summer and heat-loss

in the winter. It is only very recently that the Department of Education and Science has somewhat relaxed on the natural light factor, allowing parts of the areas to be topped up with artificial light to reach the required illumination. Mr. Mason argued that this relaxation would have to go further to allow, where appropriate, total illumination by artificial means, particularly in the case of schools in the high density parts of cities.

Mr. Mason then turned to the revolution that had been going on in Leicestershire and indeed elsewhere in the country in the methods and aims in the primary schools. In 1957 when the Leicestershire Education Authority first tried out in two areas their scheme for comprehensive re-organisation, the primary schools of the county, wherever large enough, were 'streamed', the 'A' stream containing the supposedly cleverest children of a particular age group, the 'B' stream the middle one, the 'C' stream the slowest. The main aim of the primary schools - and parental pressures was a strong factor behind this - was to get as many children as possible through the '11+' into the grammar schools and the whole curriculum was geared to this end. Thus a 7 year old child was not looked at in his own right as a 7 year old, but as a projection of what he would be like at the age of 11, and he would then be put on the escalator, leading up to that stage.

Within two years of the elimination of the 11+ in the two areas, all the primary schools had become unstreamed, each class containing the total range of ability. This inevitably involved the teachers in re-thinking their aims and methods since class-teaching, with every child performing the same operation at the same time and dealing with the same subject matter, was increasingly seen to be unpractical, if not absurd. At this stage the timetable fairly rigidly dividing the curriculum into its separate water-tight compartments still survived, but there was an ever increasing tendency to divide the class into groups. At first the groups were, for the most part, based upon ability so that in effect one had a more sophisticated form of streaming within each class. However the number of groups tended to increase with fewer children in each, until gradually the schools found themselves moving to a situation where the unit was not a group, but the individual child. More and more as the individual child came into his own, the rigid divisions between subjects began to disappear until the majority of the schools found themselves operating what has been called 'the integrated day.' The interpretation put upon this phrase

varies from school to school and while it does not disallow the setting aside of certain parts of the day for specific activities or studies by the whole class, it certainly allows, in varying proportions, the greater part of the day to be regulated by the learning needs and enthusiasms of each child at that particular moment. Thus the search for knowledge is at least for most of the day not divided up into arbitrary compartments, but may lead in a wide and frequently unexpected number of directions. The individual child instead of being an unwilling little sponge, forced to soak up draughts of pre-packed knowledge prescribed by the teacher, becomes an active explorer of skills and knowledge.

It should not be thought that under such a system the teacher abrogates his responsibility. In fact the responsibility of the teacher becomes far greater and his standing as a professional enhanced. In this situation children must be provided with an extremely rich environment and with a much greater variety of books and materials for individual or small group study and exploration. The environment is of course controlled by the teacher and it is equally through the teacher's tact, sympathy and skill that an appropriate balance of study for each pupil is achieved - not necessarily over the course of each day but over the course of each week or month.

The scene in an average classroom is one of lively activity and discussion. In one corner some children will be working on mathematical problems, others will be working with elementary science materials, elsewhere some children will be reading, others writing, making models, constructions, paintings. Children are free to move about, if necessary, even to leave the room without seeking permission since if they do so it can be safely assumed that they are leaving for sensible reasons. There is a hum of conversation as the children discuss their activities with each other and where appropriate seek each other's help. The teacher may be hard to find as he* moves from group to group or individual to individual.

When all children are being made to learn the same thing at the same time, which for most is a very boring process, the teacher is driven to stimulate interest by constantly appealing to the competitive instinct.

* In primary schools possibly three quarters of the teachers are women but to avoid clumsy constructions, a single gender has been used throughout.

In the new situation the competitive instinct in each child is channeled into competing against his own previous standards and skills, and his attitude towards others becomes one of co-operation. Equally in this situation the teacher soon learns to regard each child with respect as an individual in his own right and to behave with gentleness and courtesy. Children therefore feel free to talk openly with teachers and to say what they really think or believe, rather than what they imagine the teacher would like to hear from them.

In the old situation, each teacher kept his class strictly to himself in its own water-tight box. In the new situation, as it rapidly began to expand, the enormous increase of materials and equipment could not be contained in the classroom. The classes inevitably spilt out into the corridors in search of extra space which meant that the doors of classrooms became permanently open and children, and indeed teachers, of different classes came into contact with each other in this common space. This common meeting ground between children and teachers soon became a source for additional stimulus and co-operation. The result of all this has been in the building of schools in Leicestershire a steady move towards more and more open planning, the open door space becoming wider and wider. Since under pressure from the central government, as already indicated, it was becoming each year more difficult to achieve the minimum teaching area, except at the expense of circulation space, in the primary schools of Leicestershire the corridors have virtually disappeared as such and been metamorphosed into central common activity areas, shared by a range of open, or semi-open class bases around them. To avoid the need for corridors as such, children enter the school at many points, normally through some cloak-rooms attached to each pair or so of rooms. These changes were illustrated by slides of schools and school plans showing the trend of development in school building over the last ten years. A notable feature in this trend, in addition to increasing the open planning, has been the increasing importance of the library/resource area in the primary school. These rather than the school hall, as in the previous era, have become the central core of the school. The school hall is a more noisy and specialist area, going out onto the edge.

Another important aspect, without which the close physical interrelationships of the various spaces could scarcely be achieved, has been the building of schools in depth. This has meant ever more reliance, in order to achieve the stipulated daylight factor, on light from above rather than from vertical walls of glass around the perimeter. Windows are still provided but much more to look out of - for the external environment is more and more being exploited for educational purposes by the primary schools in Leicestershire - rather than to let light in.

Mr. Mason went on to dwell on the need for ever increasing flexibility in school building. If such enormous changes in teaching aims and methods and school design had taken place in a single decade, making ten year old school buildings totally out of date in their conception, it could be said with certainty that our contemporary ideas will be equally out of date in another ten years' time. In this connection Mr. Mason referred particularly to the size of classes. Up till now central policy had stipulated that a primary school class was not over-crowded so long as it did not exceed 40 pupils and in terms of building primary schools the Ministry of Education (Department of Education and Science) normally expected schools to be built for units of 40 children. Thus a 'one form entry primary school' i.e. a school built to take one full class for each age group, would be built for 280 children (that is 7 classes ranging from 5 - 11). The steady improvement of standards of living has however made the conception of 40 to a class increasingly intolerable and the teaching associations made it plain that they would not teach groups larger than 35 as from September 1971. Although recent primary schools in Leicestershire have been more and more open planned, none the less the buildings do still predicate a number of groups based on a unit of 40. The dilemma ensues that if one were to add additional form bases on to the school to allow for a larger number of units of 35 within the same total, the total space would be in excess of the building regulations, and under existing conditions it would not be possible to get such an enlargement into a building programme. In any event, if one were to build spaces now on the theoretical basis of a unit of 35, in another ten years' time, the standard unit will have decreased to 30 and the same dilemma will arise. In order to combat this situation, Mr. Mason had conceived the idea in the most recent primary schools now in the course of erection, of working

by analogy with the medieval castle with its central keep, surrounded by an open bailey. In other words, the general idea was to concentrate in the centre of the school, those spaces which it was likely any school would continue to want permanently enclosed with walls, e.g. staff and administrative rooms, library/resource and a reasonable number of rooms available for use by any class where either a very noisy activity which might be disturbing to others, or at the other extreme where undisturbed quiet was particularly desirable, could take place. Around this area would be a continuous run of largely carpeted area (but with suitable floor covering for messy areas, around sinks, etc.) which would be divided up by means of specially designed furniture and light screens into whatever number of divisions the school, at any moment, felt appropriate.

Another development which Mr. Mason touched on was the growing move in Leicestershire towards what is sometimes termed either 'family' or 'vertical grouping'. This is becoming particularly prevalent with the younger age groups. For example instead of having a class of five year olds, another of six year olds, and another of seven year olds, there will be three parallel classes not only unstreamed in intellectual ability but each covering an age span 5 - 7 years inclusive. This gives the teacher and the children greater stability since they have much longer time to get to know each other. At the same time the younger children have the example and help of the older children. There has also been a growing tendency for teachers, particularly in schools large enough to have more than one class in each age group, to join forces so that two or three teachers may become jointly responsible for a group of 70 to 100 children.

Mr. Mason then turned to the middle school. A typical Leicestershire middle school would be of the order of 700 pupils, taking in each year, for a three year course, some 240 children. At 'secondary' level the central government have regarded 30 as a class unit without over-crowding, and consequently such a school would be based on 8 classes in each year. The revolution in the primary school has been much slower to penetrate 'secondary' level. Up till a few years ago it would have been normal for a child of 11, used to the individual and exploratory ambience of a primary school, to find himself suddenly in a school traditionally organised, i.e. streamed with a rigid timetable, artificially divided into the usual water-tight subject

compartments, the child proceeding throughout the day from one specialist to another. However the middle schools of Leicestershire, freed as they are from the external examination system, which pupils undergo at the age of 16 and 18, have been steadily moving towards an unstreamed situation, at least in the first two years, though in certain subjects, especially French and mathematics, children may be grouped by ability, i.e. 'setted'. Mr. Mason illustrated with slides a new high school (Manor School Oadby) which incorporated many new conceptions in secondary school building, at least in so far as England is concerned. The principle of building in depth, already touched on in relation to primary schools, was here carried to far greater lengths. The library/ resource area had become of even greater importance than in the primary school, and constituted a very large space in the heart of the school, being surrounded by and immediately accessible to 16 teaching spaces, i.e. sufficient to cover the first two years of the school, grouped in units of 4, each 4 opening out on to a shared practical activity area. In each group of 4, by means of moving screens, considerable opportunities for an open plan situation were provided but one of the rooms in each 4 was totally enclosed, as suitable for language teaching etc. The furniture throughout was light and easily movable and all permanent walls were lined with benches and sinks. This particular area of the school was at least five spaces deep in either direction and therefore had to rely very largely on overhead lighting. The lack of internal windows in some of the inner spaces was compensated by internal vistas, achieved by glass partitions in appropriate places.

Another outstanding feature of the school was the concentration of all the art and craft facilities into one extensive open plan area, though the more noisy three-dimensional crafts were separated from the quieter two-dimensional ones by means of a glass screen. The educational advantages of opening up one craft visually to the influence of another had been a very striking feature. All the practical work in the school, from housecraft, through painting to engineering were now correlated under one team leader. Adjacent to the open plan art and craft or 'design' area was the provision for science and a totally artificially lit lecture theatre, capable of taking a group of 100 children or so.

Mr. Mason then turned to new upper schools, of which two, Countesthorpe and Wreake Valley were illustrated. Here again the principle

of building in depth in order to get a concentration of resources and to encourage inter-disciplinary studies was a major feature. The open plan design centres were on a larger scale than in the middle schools and considerable open space had also been achieved in the science area, which had been placed adjacent to the design area. Thus the engineering end of the design centre followed en suite into the physics, electronics and mechanical science areas of the science department. The meeting point between these two provided the scope in the school to encourage studies in technology.

In these schools, built for 1500 students, a meeting place for the whole school (other than the sports hall) would not be economically possible under the cost per place formula for school building. The normal hall had therefore been replaced by a small theatre with permanent seating to take around 250 students. A totally artificially lit drama workshop was also provided.

In the upper schools again the library/resource area assumed even greater magnitude and extensive areas were also provided for private study. A separate social, dining and private study area was provided for the older students between 16 - 18 years, and these facilities were integrated with the provision for youth and adults, since these schools were used as 'community colleges' out of school hours to serve the cultural and recreative needs of the area. Mr. Mason spent a little time talking about the development of community colleges in Leicestershire, but there is no space to enlarge on this aspect in this resume. Further information, both on community colleges and on educational development in primary, middle and upper schools in Leicestershire, as well as on school building can be found in a book entitled 'In Our Experience' published by Longmans Green, price $3.75 (obtainable from Humanities Press Inc., 303 Park Avenue South, New York, N.Y. 10010.)
In Canada, the book may be obtained from Longman Canada Ltd., 55 Barber Greene, Don Mills, Ontario. Price - $4.75.

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BETTER SCHOOLS FOR PROGRESSIVE EDUCATION

by

Alfred Roth

The problem of school building has lost none of its urgency despite of the numerous new schools which have been erected in many countries during the past few years. Although good examples are to be found, the quantitative solution of the problem bears no direct relation to the qualitative one, in which we are especially interested. The constant increase in the number of students coupled with the rapid population growth has turned the quantitative solution of school buildings into a problem of time and economics which is becoming more and more serious for all nations concerned. In fact, the shortage of schools is reaching threatening proportions in the entire world, particularly in the economically weak countries of Asia, the Middle East, Africa and South America. The production of schools with regard to the pressing factors of time and economy must therefore take into consideration those methods which have become indispensable for the similarly situated but even larger housing problems, namely an effective urbanistic, technical and economic programming and the application of particularly economical building methods by using industrially produced elements. The plan of a school with its repeated units of spaces and dimensions can be easily adapted to such new rationalized building methods. However it is the duty of the architects, in close cooperation with their clients and the building industries, to avoid rigidity and monotony which could endanger the living sense of school buildings. Furthermore, it is my firm conviction, that the school building can no longer be considered as an exclusive personal matter of the individual architect to express his very personal purely architectural ideas, his egocentric formalistic conceptions in which neither the students, nor the teachers, nor the authorities, and the public are interested. I can but state that one of the wide-spread weaknesses of present-day architecture in general is precisely the striving for eye catching and money wasting form sensations, a phenomen which by the way, was unknown in all great historic periods of architecture. I believe, that a meaningful anonymous modesty in design is one of the basic prerequisites especially of school architecture. Its foremost aim is to offer a physical environment with the best possible conditions for the mainfold animated process of learning and education of the youth.

In order to raise the qualitative solutions to the school building, essentially the following measures are required: an intensive continuation of research in educational and architectural fundamentals; the close collaboration of architects, teachers, psychologues, sociologues and authorities, and the exchange of informations upon the achievements on a national and international level. In this respect I like to pay my full tribute to the "Ontario Department of Education" especially to its "Special Education Committee" and to the "School Planning and Building Research Station". I am extremely grateful for having received their most valuable pamphlets during recent years. The school must become more and more an "open house", a kind of a community center; on the strength of this broader definition, it must strive to awaken and encourage a harmonic, democratic relationship between young and old and to counteract the dehumanizing influences of today's troubled society. In this way the huge sums of public money invested in school plants will be fully justified for they are effectively and meaningfully used to the benefit of the young and the future generations.

THE SCHOOL WITHIN THE NEIGHBOURHOOD AND TOWN AREA

Communal school planning

In modern town planning which aims are dealing comprehensively with the specific parts of the town organism and with the city in its entirety the proper distribution of educational and other cultural institutions plays its important part. Before pedagogues, architects and school authorities can even begin to consider a space program or any aspects of design and construction of a new building, the external factors which affect the particular problem have to be carefully examined. These are the requirements which are established through a careful analysis of school population of the locality, of the neighbouring quarters in relationship to the town as a whole. A farsighted school planning policy on the community scale is to-day a prerequisite for any degree of precision in the determination of site and program of accomodation of a school building.

Faulty development up-to-date

The chaotic and unsocial development of villages and towns in general during the past hundred years was necessarily accompanied by haphazard distribution and building of schools. The period of impetuous industrial expansion and fundamental changes in society and of townships, very different in its attitude from our own,

was scarcely aware of education as a public obligation. A school building was considered to be an isolated, formal problem with the ultimate aim of public demonstration. This conception in which external representation was overstressed accordingly determined the choice of the site. Schools were preferably built on important thoroughfares and in public squares, viz. some of the most striking and dominant sites of a town. Little or no consideration was given neither to a reasonable relationship between the building and the district it was to serve, nor to the control of the distance the child had to walk daily, nor to the provision of a quiet, healthy and pleasant environment. Since the importance of physical training, games and sports was little appreciated, open spaces and playgrounds were generally far too small.

The reasons for the faulty development of communal school planning can be summarized as follows:

1. Lack of a clear town-planning doctrine backed by legislation, providing for adequate school building both from the planning and social points of view.
2. Lack of deliberate communal planning both in the matter of school building and land policy.
3. Lack of a clear conception of pedagogical requirements as a prerequisite of adequate school building design in a given district.
4. Absence of collaboration between educators, architects, town-planning experts and authorities, and lack of a common basic conception of procedure.

The present situation

The democratic organization of education as adopted in most countries under local, regional and national authorities, is the first condition for the school building programme becoming an integral part of town planning. Consequently the determination of the size of the neighbourhood includes pedagogical considerations. A neighbourhood of some 5'000 inhabitants is considered by modern town-planners to be the desirable social unit, since a population of this number would require a normally sized primary school of approximately 500 pupils, within easy reach of all. However, attention is not merely confined to the essential factor of school buildings within a given neighbourhood and the town in its entirety, but within the surrounding regions as well. Research in this respect has been made by regional and national planning offices of many countries.

The practical solution to educational problems is naturally so closely linked with the regional, national, social, cultural and political structure of peoples and nations that no universally valid formula is possible.

As far back as 200 years ago, Heinrich Pestalozzi, the Swiss pioneer of modern education, a contemporary of Jean-Jacques Rousseau, set forth some still valid principles of school design which also bear on the distribution of schools and their immediate environment.

This special statement reads:

"The whole of the natural or man-made environment both of the school and the home forms a vital part of the child's physical and mental growth and of his learning and education."

The younger the child, the shorter and simpler his way to school, and the smaller and friendlier should the school be planned. This idea is shared by all leading experts in education. For its realisation, the town planner will require the allocation of ample areas of open space, so that nursery schools at a minimum walking distance, small schools at a medium distance, and normal sized schools at a maximum walking distance can be easily and practically distributed. Doubtless, the ideal solution would be a network of informal pedestrian paths, so that going to school becomes a safe, pleasant and stimulating stroll through a park.

Number of pupils and area required

Rational school planning in a village, a neighbourhood or a whole town presupposes an exact knowledge of the number of children to attend school. This information can be obtained by enquiries carried out in close collaboration with the different public administrative offices, such as education authorities, statistical offices, etc.

Obviously, the number of students will vary according to the number of years during which attendance is compulsory. If attendance at nursery schools is also compulsory, the number of infants attending must be added to the numbers of the primary and secondary schools. If, moreover, public schooling includes attendance at further educational courses with the corresponding need for additional rooms, the corresponding numbers will have to be included in the total number.

The next step for the allocation of adequate space - with due regard to the spatial needs and organization of learning - is the assessment of the classroom-unit, namely the number of pupils per class. On this point there is little difference of opinion from one country to another. The desirable average size is everywhere considered to be 30 children, or even less.

The total of school-age children, divided by the number of pupils per class, gives the total of the standard classes in the district concerned. This calculation, however, covers only part of the school-space allocation. In addition to the classroom-units, a certain number of rooms must be made available varying according to the type and size of the school, such as all kind of special rooms such as laboratories, library, gymnasium, hobbyrooms, assembly hall and so forth, apart from the various open areas.

Length and layout of the way to school

Taking into account the density of the population of a given district, the varying distances to school will have a decisive influence on the size of the corresponding school buildings and accordingly on their distribution within the neighbourhood. As to the desirable distance to school, prevalent opinions in most countries closely concur: Nursery schools should be located within reach of eye and hearing but not further than 300 metres or 1/5 of a mile.
Primary schools: here there is more diversity of opinion, the limits being 500 and 1,200 metres or 1/4 and 3/4 of a mile.
Secondary schools: The proper distance is considered to be 800-1,600 m or 1/2 and 1 mile.

These figures illustrate the tendency to keep the distance to the nursery school as short as possible and to fix the limit for the secondary school at 1,600 metres or one mile. Similar attention must be paid to the distribution of playgrounds and sportsfields located away from schools. The problem presents many more difficulties in sparsely populated rural regions. The problem of extensive distances can easily be solved by the mean of school busses, which have been introduced first in the United States and thereafter in many other countries.

Size of school grounds

In the study of the reasonable distribution of schools the town-planner is more interested in the gross ground area required for a specific type of school than in the various elements of the area for the buildings, recreation and sports. A greater area will be required if the various elements are detached and scattered, whereas two or three-storey buildings need, as a rule, less space. The most important factor, however, is for the gross area to be sufficiently large to allow for a sound distribution of the buildings, for future extensions of the school and for ample sportfields and greenpark area.

As a general rule, in my country and in many of the neighbouring countries 400 sq.feet per pupil are recommended for a reasonable size of school grounds, including in addition to the building areas, ample areas for playing during intermissions, for gymnastic grounds, sportfields, school garden and general park areas. In England for example, where greater importance is given to sports, the size of school grounds are generally much larger with 1000 sq. feet and more per pupil.

A careful overall school planning in a town or region will include in addition to the schools for normal children, special schools for handicapped and mentally retarded children. These schools will be of a very special character, and a very close cooperation between the architects and all specialists, such as doctors, psychologues and so far involved in the inner nature of the problem will be necessary.

Nature of school site

A prospective school site should satisfy three main requirements with regard to its location, namely climatic - hygienic, technical and scenic. It should be neither damp or foggy, nor exposed to strong winds. Sites in the immediate neighbourhood of industrial plants, railway yards, heavy traffic roads are out of the question. Good exposure to sunshine is in every case an essential requirement. In regard to the scenic character, the school site can never be too pleasant. Fine old trees or other natural elements should be preserved as far as possible.

The importance of the scenic environment has been overlooked quite for a long time, and even to-day this decisive factor in school planning is very often disregarded.

In this connection I can but banish some recent trends apparent mainly in the United States favouring completely windowless school buildings. It means the complete negation of the importance of the close relationship between architecture and nature.

Artificial lighting and air-conditioning are achievements of modern science and technology which doubtlessly nobody would question. They may be applied in schools too, air-conditioning, first, for reasons of very special climatic conditions, cold or hot, and secondly for a limited number of special rooms only such as laboratories, auditoriums, assembly halls etc. Artificial lighting should be used to supplement natural daylight only of all those rooms, mainly classrooms, in which the children spend most of the daily school hours. The authorized answer to the problem of windowless schools is given by psychologues, doctors, ecologues and educators, but not by narrowminded economists and technologists.

THE SCHOOL AND ITS ELEMENTS

Historic development

During the second half of the 19th century, the decline of architectural conception and creative thought was rapidly approaching the lowest possible level characteristic of that deeply uprooted and contradictory epoch. The fact that school buildings became a state concern, furthered their erroneous development from the start. The architects were automatically compelled to confer upon these public buildings the prevailing pathos of representative and monumental appearance.

The immediate effects of the conceptions of that period can be roughly summarized as follows:

Unfunctional and undifferentiated space organization;

Unfunctional and non-creative design;

Out-sized buildings.

The extreme simplification of the problem corresponded obviously to the aims and methods of teaching at that time, consisting, on the whole, almost exclusively of the unilateral transmission of abstract facts from teacher to child. In most schools there was no space for any one of the many special rooms needed for an extensive and many-sided active curriculum, comprising manual and experimental work and little provision was made for recreation, games and sports outside of the building.

The present situation

The necessity and importance of public education are out of question to-day. In most of the countries extensive efforts are being made towards re-organization and extensive research on pedagogical and school building principles. England has started with setting an outstanding example in that matter.

Pedagogical principles

I guess there is no need for discussing this subject in this audience. I only wish to stress the basic importance of the pedagogical fundamentals for the design of proper schools. The compilation of comprehensive international literature on education, is growing daily and affords an impressive picture of the high level reached in this domain. The pedagogical principles, partly formulated already by Henry Pestalozzi 200 years ago, which permit a satisfactory design of the school building can be summarized as follows:

1. The child is the subject and not the object of education and learning, and and consequently of the school building (scale of the child).
2. The object of education is to gain a grasp of the whole human being, the psychic, intellectual and emotional life. This can only be achieved by a flexible system of many different activities (differentiated space planning, greatest possible flexibility).
3. Learning methods must be adapted to the child's age and talents (individual instruction, group work, friendly rooms).
4. Education at school must be considered as the continuation of positive or negative family influence. Therefore the closest possible affinity between school and home - a decent one - with respect to rooms and atmosphere must be attained ("living-room education" as claimed by Pestalozzi).
5. The entire environment in which the child lives and learns is an integral part of education (unity of fundamental architectural conception, close affinity with nature).
6. The child is gifted by nature with creative imagination and loves all that is true and alive (lively architectural design, exclusion of all that is not genuine, schematic or artificial).

I like to add one original statement literally translated of Pestalozzi:
"The true teacher full of humility being aware of the weakness and the limits of his own personality does not venture to influence the child's inner growth through violence".

I quote this statement because it has to be directly related also to the architects' own attitude to his mission.

Architecture and pedagogy

There is a striking similarity in the development of modern architecture and modern pedagogy. Both started from an unprejudiced conception of man's life and needs and placed highest importance on functional, psychological and social factors. Lastly, a number of events have taken place simultaneously. Thus, three years after the "Bureau International d'Education" had been founded in Geneva in 1925, the leading modern architects of many countries, among Le Corbusier, met in 1928 at La Sarraz (not far from Geneva) and founded the "International Congresses of Modern Architecture" (CIAM). The aim of the organization, which became well known throughout the world, was to establish the fundamentals of contemporary architecture and town planning. The CIAM have been dissolved in 1956.

Already in the early 1880's, Louis Sullivan, the pioneer of modern American architecture, expressed the very essence of the new conception of architecture in his dictum - "Form follows function". To this, Sullivan added a second dictum of equal importance: "The solution can only be found in the problem itself". In other words, a problem cannot be solved by applying ready made designs and recipes of form; it must be found and developed creatively from its own inner nature. These two factors are of particular importance in school design.

Differentiated sizes of schools

A review of the faulty historic development of school building has proved that schematism and over-dimensioning have been of the most typical and frequent features. How large should a school be? A reply to this question can be found, all the more easily once the architect has elucidated the two following points: for whom and for what purpose should schools be built at all? To arrive at an adequate solution, it is essential that the problem should be differentiated both from the angle of the child and that of education. This conception is shared by all progressive educators and school architects, and has been applied successfully in several places during the past years. The following grading for school sizes would appear to offer a fair basis for the solution of the problem:

Nursery school	2-3 classes
Small school	4-6 classes (lower grade)
Normal school	8-12 classes
Large school	16-24 classes

From the small community of the nursery school, the child will pass without much noticeable transition into the next wider community, namely the small school of 120 to 200 children. A further step leads from the small school to an ever-widening community, the normal school of 300-400 pupils. The final step, involving no problem, will take the child into the large school of 500-800 pupils.

Flexibility in plan and building

Pedagogics as a science and all questions related to child education are in a constant state of evolution. The greatest possible flexibility must therefore be ensured wherever the plan and final form of a school building are concerned.

The building provisions as a whole should be considered as a flexible envelope over the various functions in order that these can freely develop. Moreover, the

general lay-out and construction should be conceived in such a way that internal and external alterations arising from new educational needs can be achieved at little cost. The arrangements made, both in regard to space and construction for the greatest possible adaptability to changing needs, will be the best guarantee that a building will serve its purpose over a long period. Though apparently inconsistent, it is nevertheless true that a school massively built at great cost to last for many generations will age much sooner, and become more quickly inadequate than a lightly built adaptable one. The idea of flexibility is not only a pedagogic requirement but is also based on purely economic grounds. To quote only one example: After the First World War, a number of in timber lightly-built one-storey school pavilions were put up in various quarters of the town of Zurich. Several of these originally temporary thought structures are now, 60 years later, still in use, and the children love them. They will naturally disappear one after another. But they have served their purpose and the cost long since defrayed, so that their demolition will be no financial loss to the town.

One-two-and-three-storey buildings

There is no doubt, that the one storey school building is best adapted to the actual requirements of pedagogics and hygiene. Especially for the lower grades, the one-storey pavilion affords an ideal solution in all respects: natural lighting, cross ventilation, flexibility in plan, construction and out-of-door activities in front of the classrooms. During the 20ieth and 30ieth this type of school has been propagated by modern educators and architects as the only defendable form of a modern school. It existed during that period in Europe an international association started in Germany which aims were the propagation of open-air teaching by the mean of pavilion schools.

While, however, one-storey schools offer innumerable advantages, it would be erroneous that this type of building is the one and only answer to the problem. The question therefore arises as to whether a greater concentration by adopting two- or three-storey buildings is admissable and how it can be achieved to comply with modern educational, psychologic and hygienic requirements. An early concluding answer to this question has been given by the three-storey so called open-air school designed already in 1930 by the well known architect J. Duker in Amsterdam. Inspired by this revolutionary example, I designed in 1933 a much larger three-storey school upon similar principles for a general competition among the architects of Zurich, but it was rejected by the jury for being too modern at that time. Since that period,

and especially after the War numerous two-and three-storey primary and secondary schools have been built of most varied conceptions in all progressive countries. I shall show a selected number of good examples by slides and discuss their specific design.

The classroom-unit

Although modern pedagogics demand more differentiated teaching methods and a considerable number of special purpose rooms, the classroom will still be considered the basic element of the school. In designing the classroom, account should be taken, on the one hand, of well regulated lessons and freer activities and, on the other, of the need for a healthy, friendly and stimulating atmosphere. Such a classroom is now generally termed "classroom-unit" and should be designed according to the following considerations:

1. Functional space organization upon educational principles;
2. Size of the classroom-unit;
3. Lighting, ventilation, construction;
4. Furniture and equipment.

The classroom-units vary in flexibility and structure in proportion to the nature and the freedom of teaching and learning. Obviously the most flexible and unconfined space arrangement must be that designed for the lowest grade since here learning consists of a loosely connected sequence of varying activities. The shape of this classroom-unit should therefore differ only slightly from the nursery school type: it should contain a number of alcoves or recesses, or auxiliary rooms in which the children can be separated into a number of groups for varying activities. The classroom-unit can be simpler for the intermediate grades, although here, again, due consideration must be given to work carried out by smaller groups. The room for the upper grades might be still further simplified, although, for practical and psychological reasons, a more individual shape than the rigid rectangle should be sought. In every case the solution of the problem must be found in its inner nature.

The size of the classroom-unit

In estimating the size of a classroom-unit, the absolute floor area is not as relevant as its relation to the number of pupils, this being in general the basic principle in administrative regulations governing the construction of schools. Additional regulations for a fixed shape and size of classrooms are to be condemned.

In all countries where education has been subject in recent years to research and reforms, the floor space per child has steadily increased. The size of the classroom-unit is to be determined by the following pedagogic requirements:

Flexibility in teaching and learning

Working in small groups

Mobility of seats and desks

Ample cupboards, shelves, etc.

Friendly and stimulating atmosphere.

Apart from all regional and national conditions, one rule must be observed during programming and designing a school: In every case the classroom-unit shall be as large as possible. Care must be therefore taken to avoid all waste of space outside the classroom-units and the special rooms as well (i.e. for corridors, halls, etc.). What children need is space and no architectural fauciness or luxury. The highest requirements I know can be found in some schools designed by the American expert Ernest Kump in the area of San Francisco. He recommends 30 sq. feet per pupil and not more than 30 children per class. Kump's quite well known formula reads 30x30x30, what means a square shaped room of 30 feet large and 30 feet deep for 30 pupils. The neutral shape of the square offers indeed, if sufficiently large in total floor area, all possibilities for progressive learning methods being at the same time of simple and economic construction. In contrast more differentiated classroom forms with alcoves and so far may, however, offer even more interesting teaching possibilities but the cost of construction may be higher. Also with regard to the size and shape of the classroom-unit, the varying nature of the problem from country to country does not allow to advocate an universally valid floor unit per student. In my country for example the unit recognized by the school authorities is much smaller than 30 sq. feet per pupil, namely about 20 only. Since our school buildings are financed by the communities and subsidized by the respective canton (or state) but not by the Federal Government, a given community is free to ask for higher floor-units but this excess over 20 sq.feet will not be subsidized by the canton.

Equipment of schoolrooms

Adequate equipment is indispensable by reason of the diverse nature of school activities. In this connection, the requirements advocated by modern educators are quite high and can in no respect be compared with former conceptions. An equipment which is carefully adapted, both practically and psychologically, to a particular form of teaching and agegroup, will give the schoolroom that informal atmosphere,

which already Henry Pestalozzi advocated by stating:
"The classroom should be like a living room".

Tables and chairs must be easily movable at all times according to the type of lesson or free activity (work in small groups, games, theatricals, episcope or diascope projections, audio-visual learning, outdoor activities etc.). Furniture must be as light as possible and with preference stackable: desk and seat should be detached. Experience has shown that double desks (tables for four in Germany) offer the most practical solution. They are better than single desks inasmuch as they induce children to work and get on together.

The common practice, after lessons, of storing away the various objects shown to the pupils, should be abandoned. This practice is contrary to modern conceptions according to which such objects should be permanently on show for the children. These collections - if suitably housed in showcases in class - and special rooms, corridors, passages, halls, etc. - in addition help to enliven the school.

Travelling exhibitions and exchanges should be more and more encouraged, and will help towards making the school a living and attractive educational establishment for all, children and adults alike.

Decoration, colours, art in school

Decoration of the schoolroom is essential not only as an adjunct to lessons and teaching, but as a contribution to its friendly atmosphere. Best suited for this purpose are: good photographs from nature, sciences, architecture, technics, crafts and industrial production, social and cultural life, as well as works of art or good reproductions, both appealing to the imagination of child. A large part of the interchangeable interior decoration should be entirely left to the initiative and talent of the pupils themselves. It is commonly thought that colour should be used for the general decoration of the school building. This conception, however, is justified to a certain extent only. Actually, a number of colour accents are automatically provided: the children's clothes and works, plants and flowers, certain objects used for teaching and learning. Strong colours clash with lighting requirements and with the principle of flexibility in teaching and learning. Saturated colours should therefore be used with the utmost care, although light shades can be used throughout.

There is to-day in many places a tendency to decorate the school as a public building with works of art. Any attempt to introduce pupils to an appreciation of art is desirable, however, children are interested above all in their own artistic creations.

The works of art found in most schools - murals, mosaics, sculptures, stained glass windows - serve their purpose for adults exclusively, but not for children. A satisfactory solution to this controversial problem is possible only when the artist is truly capable of penetrating the child's own sphere of imagination through an art of stimulating forms and colours.

The rationalization of school construction

Building rationalization, what means reduction of costs and time of erection by adopting industrially produced elements and money and time saving new methods of erection has become one of the very actual problem of present-day construction of apartments, industrial plants, office buildings, and schools as well. A great number of new building systems with prefabricated elements and bearing structures have been developed during recent years in many parts of the world and have been successfully applied. It is certainly justified, that the tax payers and the authorities have every right to insist that new structures shall be as cheap as possible and that school building programmes shall be carried out within the shortest possible time.

The presuppositions for a comprehensive rationalization of school construction are, as it has already been said, positive ones due to the easy unification of the size and shape of many rooms without interfering to any serious extent with an imaginative design. Existing building regulations must be subjected to revision, for out-moded codes and narrowly conceived regulations can suffocate fresh ideas and prevent effective reduction of building costs by means of new building methods.
Only structural parts, wall and floor elements, windows, doors and so far should be subject to standardization and mass production, but not the school building as a whole. It is not necessary to stress that skeleton construction permits an especially rapid and cost saving erection process. In the United States, England, Germany and other countries light steel frameworks are commonly used for this purpose. In France, the home country of reinforced concrete construction, a number of building systems in the same material are on the market. For my school projects in Kuwait, one of these french system made of prestressed concrete elements will be used.

It goes without saying that the absolute reduction of school building costs is to be held within the limits imposed by the purpose and use of the structure. After the space problems have been properly dealt with, it is the solidity of the building to which most attention must be devoted, exposed as schools are to youthful exuberance and the consequent wear and tear. In addition to fulfilling their practical functions,

school buildings must remain in technically sound conditions in order that they may continue to play their part in the ethical and aesthetic formation of young minds. For this reason mere cheapness of construction will not pay in the long run, as it will quickly give rise to considerable costs of maintenance. In addition to the absolute, the relative reduction of construction costs is important. By this is meant the aim of saving money by means of rationalized building methods in order to use the savings for achieving even better teaching, learning and working conditions through increased space and better equipment. Finally, a realistic approach to the problem of school building rationalization has to take into account the given local or regional conditions such as building industries, materials available, transport, labor. In case, the answer to the problem may be a combination of some prefabricated structural elements with local materials for the remaining parts of the building. The problem of school building rationalization cannot, of course, be solved by concentrating on a single building only. Farsighted school planning in connection with the general development of the town, city or region is the first requirements, namely the rational distribution of schools and their grounds being acquired in good time at reasonable price. I could mention cases, where the land costs were considerably higher than the total costs of the respective school building! As it is well known especially among town planners, the realistic land policy in our western countries is extremely weak due to our unsocial economic and political systems.

Final Statements

I hope having presented by words and slides quite a positive picture of the present state and development of school building. Once a building and I mean a good one is completed, it depends but essentially of the teachers with their pupils how they will use it, what they will make out of it. In this respect the architects imaginative work is but the framework and so to-day but a tool to be used with similar imagination by teachers and educators. My numerous visits of schools in action of various countries show clearly, that a new generation of well prepared teachers with imagination and an open minded attitude to the architectural environment is in a growing state. With these statements I give the subject of our conference back to the responsibility of the teachers and educators, to the educational research institutes and to the local and national authorities.

Concerning the problems of education, school building and society as an entirety, I wish to add a few statements of general concern.

If our so called civilized, but in fact so deeply profit minded society together with its political leaders we elect ourselves, will not be able to solve among the many problems it is confronted with, that of education and its healthy environment to which nature belongs as factor number one, our future physical environment may be made of a wide spread and greenless mess of unhuman and ugly artefacts above or under the grounds. Such a pessimistic outlook into the future shows the enormous and rapidly growing gap between the impressive progress and achievements of science and technology, and the well being of man and society. To mention among, man's conquest of the moon, for which, milliards of American dollars and Soviet Russian roubles have already been spent, while millions of people are starving and illhoused and thousands of soldiers and civilians are killed through highly developed War methods. I add another aspect to the pessimistic outlook into man's future environment, namely that of the rapidly progressing pollution of the air, of the waters of our rivers, lakes and seasides, in brief, the progressing destruction of nature and country sides. But let me end-up by returning to the proper concern of our conference by expressing the hope of all of you and of myself, that better education, better school building and a better integration of them in urban and regional districts may effectively contribute to making the youth aware of the present dangers which threatens humanity, aware before all of the meaning of life and of true democratic civilization and to preparing thereby the future generations for an effective contribution to a survival in happiness, dignity and peace.

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AN ECONOMIST'S VIEW OF SCHOOLS AND SCHOOLING

by

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Economists have been interested in the economic aspects of education from the first instance of recorded thought in our particular discipline. Plato, in The Republic, described not only the educational system for his ideal society, but the means whereby it would be financed. Adam Smith, almost 200 years ago, both analyzed the economic significance of education and presented a financing proposal which has regained some currency and which will be discussed in more detail later. But it is only in the past 15 years that a relatively large number of economists have turned their attention to many specific economic questions relating to education. This incursion has not been welcomed by some educators who apparently feared that the non-economic or intangible aspects of education would be ignored. Increasingly, however, educators are working with social scientists to specify and measure those features which had earlier seemed to defy quantification and inclusion in any analysis of educational innovations.

This emphasis on the economic aspects of education has developed for several reasons, but the major one probably has been the public's reluctance to bear the rapidly increasing educational expenditures. In the 1950's and early 1960's there seemed to be a unanimous view that much more spending on education was merited. But now, of course, the setting of ceilings on such spending has led to a more careful examination of the types and levels of programs, which merit expansion and those which should be altered or discontinued.

One could spend much time reviewing what has been done - and has not been done - by way of research in the economics of education. One could also plunge into at least two current political issues - the use of property taxes in financing education, and the setting of teachers' salaries. Instead, I would like to discuss briefly only a few questions under each of three general categories. These are: 1) productivity and efficiency; 2) financing; and 3) programs. I plan to outline what I mean by productivity and efficiency and some problems in calculating these. Under the heading of financing I will look at the matter of public and private support for education and a proposal for financing education in quite a different manner. "Programs" is

admittedly a catch-all category including vocational training and pre-school education. I shall try to confine my remarks, in each of these sections, to elementary and secondary education. This presents a minor handicap since most of the economists' research has been concerned with post-secondary education.

Many teachers, and even administrators, have been loathe to discuss not only means for improving the productivity of educational institutions, but the very notion of productivity itself. Unfortunately, the "pin-the-tail-on-the-donkey" approach to budgetary trimming that is in vogue this year is not a notable improvement on "the ostrich-head-in-the-sand" approach. The trems <u>productivity</u> and <u>efficiency</u> often have been misused; this possibly accounts for some of the apprehension. Both words mean essentially the same thing: namely the comparison of the total outputs with the total inputs for any process whereby some resources are transformed into other, usually more desirable, resources or products. <u>Efficiency</u> is sometimes used in a more restricted way to refer to the production of a given good at the least cost per unit, or to technical or physical relationships such as achieving the maximum use of a given room or building in a specified period.

But the important concept is productivity. Furthermore, we must distinguish the productivity of the educational institution from the productivity of education. The first case refers to the relationship between the resources used by the school and its product, however this may be defined. The second case refers to the effectiveness of the school's product or graduate in the labour force. We should also distinguish <u>total</u> productivity, the comparison of total outputs to total inputs; and <u>labour</u> productivity, the comparison of total outputs with only the labour inputs - usually expressed in man-hours or total wages paid.

At this moment, our concern is with the <u>total</u> productivity of the school or college. If we emphasize that we are comparing the <u>total</u> output with the <u>total</u> input, it should be obvious that this is the paramount concern in managing our educational system. The problems with productivity measures in education have arisen for several reasons but the basic one is that we do not have general agreement on what the output is or how it should be measured. Secondly, if we do not know what the output is, we cannot know when there has been a change in quality, as well as quantity. Even when we do find some agreement on the objective of a particular program, such as a measured improvement in reading skill, we do not have a method for adding this output with that of another program.

It is not surprising therefore, that we find so much attention paid to the student-teacher ratio. This is the most obvious comparison of output with input. Productivity, especially labour productivity, can be improved one might argue simply by increasing the number of pupils per class-room or per teacher. But as the recent "Crowded Classrooms Cloud The Mind" campaign emphasized, this change may also alter the quality of the product. This campaign should also have shown us that it will not be sufficient simply to assert that a particular change will improve or worsen the use of our educational resources. We need to seek agreement, not only on the objectives of the schooling system, but also on the measurements of these objectives, and the means whereby the multiple objectives can be combined in one final sum.

The urgency of getting on with this set of difficult tasks should be apparent in the variety of proposals and experiments undertaken in the expectation of improving the productivity of the schools. These have included programmed learning, audio-visual aids, televised instruction, teachers aides and team teaching, open-plan classrooms, independent study, larger or smaller classes and larger or smaller schools, and year-round operation. A number of these alternatives are now past the experimental stage, perhaps because there was not careful evaluation in the initial stages. The novelty of design or approach was sufficient to gain wider acceptance of some alternatives such as the open-plan classroom. While some proposals have a logical or aesthetic appeal, such as the "educational park" encompassing all levels of education, or the colourful, comfortable seating in school libraries, the taxpayer, politician and administrator must enquire about the <u>total</u> impact of innovations, in terms both of the overall effects on the students and the overall requirement of resources. Thus, for example, studies of team teaching may show higher student achievement levels than under conventional instruction techniques, yet omit possibly greater joint preparation time or reduced scheduling flexibility. This is where systems analysis shows its research capability for with a well-specified model of the institution, the total impact of an innovation is revealed to an extent that is not possible without this approach.

Calculations of the productivity of the schools and colleges can tell us whether we are making better or worse use of the resources directed to the educational sector. But there remains the question of how many of our economic resources should be allocated to education. The only possible approach to an answer lies in the use of benefit/cost analysis. This technique has been widely criticized, not only by educators but also by some economists. But the criticism has been directed to the

particular data that are used in the analysis rather than to the technique itself. (In fact, cost/benefit analysis is so commonly used in our everyday decisions that we fail to recognize it as such when we say that "I can't afford it" or "It isn't worth the effort".) There are some important considerations in deciding to use any one of the three major measures: the internal rate of return, the benefit/cost ratio or the net present value, but these are not the basic problems. Benefit/cost analysis consists of comparing all of the benefits of a particular investment decision or project with all of the costs. The costs are relatively easy to determine except perhaps the estimate of income and output that is foregone while students are in school or college. The benefits are considered to be the additional income earned or goods and services produced by the graduate. But there are four basic difficulties with this comparison:

1. How does one determine what portion of the graduate's additional earnings are due to his further education alone?
2. How does one identify, and then measure, the nonmonetary benefits to the individual and the benefits to society-at-large which are not reflected in the payment for additional output?
3. How valid are the earnings differentials of the past in estimating future benefits?
4. What are the marginal or additional costs of expanding a program? Are the marginal costs greater than, equal to, or less than the average cost per student in a given program?

Some progress has been made on the first and last of these questions; the 1971 census will give us further evidence on earnings differentials since 1961; but the question of education's benefits to society is of paramount concern. Until we have satisfactory answers to this question we will be faced with crude assertions that more of this or that kind of education is or is not socially desirable. Meanwhile, the existing calculations can offer some guidance in decision-making. For example, if we find that the net present value of a technologist program is three times that of a teacher-training program, can we say that the nonmonetary benefits to society of the latter program are equal to the difference between the two net present values? If not, then we should consider a reallocation of our resources between these two programs.

One may argue that such analysis is irrelevant to elementary and much of secondary education both because school attendance is compulsory to age sixteen

and because society's expressed goal is to provide equality of educational opportunity in a context of freedom of choice regarding educational programs. But benefit/cost analysis can demonstrate the costs and benefits to society of each of these policies so that they can be evaluated more carefully along with social policies in other fields.

The first section of these remarks has dealt with the productivity of educational institutions and the net returns to education. In this next section, the question of financing these expenditures will be considered. I could examine the patterns of spending in the past, by levels of education and levels of government, review the proportion of public expenditures going to education, and offer projections of future expenditures. But this has been treated elsewhere, notably by the Canadian Teachers Federation, the Canadian Federation of Mayors and Municipalities, and the Dominion Bureau of Statistics.

One might also be expected to deal with the question of taxation - especially the use of the property tax to finance education. But this too has received widespread attention, from the Ontario Committee on Taxation to the frequent personal interviews in the communications media. Instead, I would like to raise some other issues in the financing of education that have received less attention.

An important current question at the post-secondary level concerns the appropriate division between private and public financing of these programs. Now that the provincial governments are curtailing grants to universities and are attempting to exercise more direct control, there is an increasing interest in finding a method of generating more private support while not interfering with the accessability of higher education for students from lower-income families.

At the elementary and secondary levels there does not seem to be any doubt that education should be publicly <u>financed</u>, but increasingly, I expect, we shall see a reconsideration of the extent to which schooling should be publicly <u>provided</u>. There are at least two general alternatives to the public school system. Local and/or provincial governments could directly purchase student places in privately provided schools. The other alternative would be to make funds available to students or their parents to enable them to purchase educational programs of their own choosing. This is the voucher scheme which has been advocated for some time in Great Britain and now is being discussed widely in the United States.

The voucher scheme deserves our attention if only because it has moved beyond discussion of hypothetical plans to the experimental or pilot study stage. The United States Office of Economic Opportunity has made small grants to three school systems, in California, Indiana and Washington, to design a voucher plan. If these plans are approved by the federal and local governments such schemes could be in effect as early as this fall. Under a voucher program parents would receive a chit from the local government approximately equal to the existing per pupil costs for each level of education. These chits could then be used only to purchase education but at any school selected by the parents.

Voucher scheme proposals are not new. Adam Smith and Thomas Paine each advocated such a plan for educational financing. What was essentially a voucher scheme was used in the veterans rehabilitation program following World War II when the federal government paid both the tuition fee and a supplementary amount of $150 on behalf of each veteran at the university of his choice.

The proposal was revived in 1955 when Milton Friedman published an essay concerned with the individual's freedom of choice to choose the most suitable form of education for himself or his children. His proposal was simply that

> "Governments could require a minimum level of education which they could finance by giving parents vouchers redeemable for a specified maximum sum per child per year if spent on "approved" educational services. Parents would then be free to spend this sum and any additional sum on purchasing educational services from an "approved" institution of their own choice. The educational services could be rendered by private enterprises operated for profit, or by non-profit institutions of various kinds. The role of the government would be limited to assuring that the schools met certain minimum standards such as the inclusion of a minimum common content in their programs, much as it now inspects restaurants to assure that they maintain minimum sanitary standards." *

The detailed operation of an justification for a voucher scheme was developed in Great Britain by Peacock and Wiseman in their monograph, Education for Democrats and by E.G. West in his book, Education and the State.

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* Milton Friedman, "The Role of Government in Education," in Robt.Solo (ed.), Economics and the Public Interest (Brunswick N.J.: Rutgers University Press, 1955) p.127.

But the quite pragmatic arguments were not fully developed until a recent study was sponsored by the U.S. Office of Economic Opportunity. The OEO was concerned primarily with the quality of schooling provided for children of low-income families. Thus, one feature of the OEO scheme is to attach a higher value to the vouchers for poor families than those for rich families. In this way the poor families are expected to buy a higher quality education and thus move to close the educational gap between rich and poor. Provisions are also incorporated in the scheme to avoid de facto racial segregation, religious instruction in parochial schools, and supplementary payments from parents above the value of the voucher.

Opposition to the scheme has come from the National Education Association and the teachers federations. The teachers obviously would be unhappy about prospects of negotiating salary scales with each school. Others fear that the upper-middle class parents would rigorously seek out and develop the best schools while the poor families were content to let their children continue at the neighbourhood school. There is also the question of how parental influence in the school organization and curriculum would be effected. The list of questions and arguments could be greatly extended. The concern here is simply to focus on this significant development and to note that it is not necessarily a remote possibility in this country. A voucher plan would seem to be the next logical step once parents are permitted to send their children to other than their neighbourhood school.

The third section of this paper is concerned with two general aspects of program offerings: pre-school education and vocational training. I do not pretend to any special knowledge of the learning needs and abilities of pre-school-age children but I am interested in the recommendation made by the Education Policies Commission in the United States to the effect that public education should begin at age four. At least two economic considerations relate to this proposal. First of all, it apparently is clear from child-study research that a child's ability to learn in later years is dependent on his environmental influences in his first four or five years. Thus, it would seem that a relatively small expenditure made in these early years would significantly enhance the returns to educational expenditures in later years.

The second point is closely related to the first. A significant part of educational expenditures are currently directed almost solely to equalizing the educational opportunities of so-called "culturally-deprived" children.

As the number of private nursery schools increases, the initial discrepancy in the learning ability of kindergarten children presumably will also increase, leading to an even greater expenditure in later years to overcome these differences. It would simply seem to be a rational economic decision to begin public schooling at an earlier age.

The second matter of program or curriculum concerns vocational education or training. This subject has been a difficult one since the introduction of manual training late in the last century and particularly since the expansion of federal assistance for vocational training in the 1940's. The earlier problems of whether or not vocational training was a proper function of secondary schools, and if so, whether the training should be skill-specific or general, still remain. But more recently vocational training has been defended on the grounds that it reduces the dropout rate, and thus the teen-age unemployment rate.

In view of the high costs of vocational training programs, it should be surprising to find so little economic analysis of their effectiveness, except that this has been true for some other high-cost public programs. Evidence from American studies indicates that using vocational training as a dropout prevention program is very costly. In a study of the community high school system in Worcester, Massachusetts, it was found that, depending on one's assumptions, the cost per drop-out prevented was from $4,000 to $12,000 (in 1964 prices). If the benefits of such programs are the marginal increases in lifetime income which result from graduating from high school rather than dropping out in grade 10 or 11, then the net benefits are negative except under some rather restrictive assumptions. We have learned to be cautious in drawing conclusions from studies in other educational jurisdictions and studies which look at only the monetary benefits of a program, but this example should at least encourage us to doubt the economic validity of vocational training for decreasing the dropout rate.

There remains the question of whether vocational training for its own sake is an appropriate function of the secondary school, and if so, what form this training should take. It is widely, if not unanimously, accepted among economists that forecasts of manpower requirements are unsatisfactory for planning vocational training programs, especially for secondary school students, not only because such forecasts cannot be accurate over the implied long-range, but also because they do not take into account the substitutability of labour skills and cannot specify

the amount of training actually required for the various occupations. It is therefore argued that since the demand for specific skills cannot be forecast accurately, vocational training should be based on "clusters of job families", or skill-related occupations. But there is also the danger that the needs for "general training" can be interpreted with greater variation than when the skills, and thus the training requirements, are more closely specified.

These remarks have touched upon what may seem to be a number of unrelated topics of only secondary concern in a conference on school buildings. The common elements, however, are: 1) a concern that we examine closely - especially as resources for education are more difficult to obtain - the costs and the benefits of educational innovations; and 2) that we anticipate what I at least expect to be the major changes in our schooling system - schooling at an earlier age, a decline in vocational training, alternative methods for financing our schools, with the implied consequences for alternative school designs.

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SPECIFYING FUTURE EDUCATIONAL NEEDS IN A CHANGING POLITICAL CLIMATE

by

Cicely Watson

In order to prepare my paper for today I first spent an hour or so discussing the theme of the conference with two of my colleagues who were on its planning committee. This was several months ago. I learned that for three days we were expected to take "A broad look at future educational needs", that the audience would probably consist of academics who operate educational systems and institutions and who are accountable to public authorities for their administration; of public officials who are responsible for regulating educational systems and advising on policy decisions as to their nature, their clientele, their process and their funding; of elected politicians who make educational policy decisions; and members of the public and representatives of industry who have an interest in this public sector because (a) they and their children are its clients; (b) they direct industries which use its "products" (i.e. they employ its graduates) and/or (c) they direct industries which supply its "needs."

I have been a professor in the Department of Educational Planning of OISE for six years. Before that I worked for almost two years in the Department of Educational Research of the College of Education of the University of Toronto (the institution which used to be known as O.C.E.) which undertook many educational planning tasks for the Ontario Department of Education and various reform committees set up by the Ontario Minister of Education. For about eight years, then, I have worked full time preparing what might be generously called "estimates of future condition" of the educational system of Ontario in order that reform might be planned and implemented.

Over these years I have made many speeches about the "future" of education in Ontario, an average of between two and three per year. So being a planner by nature as well as vocation my second step in preparing this paper was to get out my file of old speeches and read carefully through them to see (a) what I could use; (b) what I could adapt; and (c) what was now unusable. Having read these speeches I took my third preparation step before sitting down to write (and not all this activity was merely an example of my reluctance to set to work, although

I admit there was a grain of "rationalization of delay" in all this), which was to check statistical information readily available in my department showing the present condition of Ontario's educational institutions--their enrollment, plant, teachers and professors, programs of study, budgets etc.--and five and ten year estimates of change.

The three steps which I took are basic to the work of a planner: first to talk to the client, who defines the task; second to look at the task to try to estimate what is new, what is unlikely to change, what must be discarded, what can be salvaged, what cannot be changed (or at least only at such cost as to likely prove impracticable); third to try in precise terms to statistically define the present and the past in order to look at the future.

Moreover they enabled me to frame some generalizations with which I wish to begin, with which I always begin. So if there are members of this audience who have already heard me speak about educational planning or predicting the future needs of educational institutions in this province, they will find the first part of this speech familiar. If they find it tautological, and hence boring, my apologies. These points are nevertheless true and must be reiterated, because however frequently and firmly they are stated they are always discounted by the listeners:

1) A forecast of future conditions (i.e. the prediction of the magnitude, incidence and distribution of a phenomenon) is always in error. It is in error because we cannot precisely predict change; we cannot accurately predict change because
   a) Although the seeds of many changes are now present, we cannot tell which will flower;
   b) There are seeds of change which themselves have yet to be sown but which may develop extremely quickly;
   c) Our definition even of the present and the past is imprecise because of the quality and type of statistical data with which we work; and
   d) Even if we had better data we are too ignorant of the systems under study (in this case the educational system and the society which it serves) to understand what the data represent and what the relationships are.
2) Forecasting is generally a "conservative" activity. One starts with a time series of past data, makes assumptions about relationships and trends,

2) and extrapolates these into the future. Under-prediction of change is much more common than over-prediction.

To quote from a speech about educational costs in the decade 1968 - 1978, which I made in November 1968 at a conference of the Canadian Tax Foundation:

> "The first step in a planning process is the forecast of conditions and relationships based on a documentation of the present and a study of the past. To be usefully manipulated these forecasts must be expressed numerically. The relationships forecast are generally of two types--an extrapolation of identifiable direct-link trends, or a statement of the relationship of one or more phenomenon indirectly linked with the condition under study. In the first the future quantity is treated as a function of time. In the second the relationship between the forecast phenomenon and the conditions under study is indirect and operates through a set of time-linked variables.
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> Forecasting becomes prediction to the degree that the author is prepared to assume constancy (or make statements about expected changes) in the historical relationship upon which the forecast rests. Long-range forecasts (10 or more years) are, of course, fraught with danger and error.
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> Why then does the planner engage in them? Or rather, why does the planner make public his/her forecasts knowing that many people will regard them, and use them, as predictions? Part of the explanation, I suppose, is that we enjoy making predictions. When we find our figures are close to reality, we tout them to our colleagues as evidence of our perspicacity. When we are grossly wrong we can always find the explanation in a radical unforseen change not provided for in our assumptions. But the educational planner's need to prepare long range forecasts is endemic to the job. The production process for which he/she is planning is of long term. In our society we provide for at least 10 years of compulsory full-time general education (i.e. the legal school leaving age is 16 years and the legally required entry age is 6). But the mass education implied by such legislation goes far beyond this. It takes about 13 years to produce a qualified tradesman, about 13 to 15 years to produce a technician or a technologist about 16-20 years to produce a professional.
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> The public sector has responsibility for a large number of such long-term production processes. If they are to be managed efficiently the commitment of today's resources must be related to the demand for the future product. Planning to meet anticipated demand is an important part of planning. The educational planner must try to anticipate and reconcile the choices of students and their parents and the needs of that future society and its economy. He therefore makes forecasts--of enrollment, of personnel and plant needs, of entry, flow and exit numbers (or in traditional

> educational terms of admission and promotions policy) of revenues, of costs, of manpower requirements. When the data is bad or the ignorance of related factors is great and the need for some sort of numbers is high, he/she even makes predictions."

But this paper is not merely about specifying future educational needs, it is about trying to undertake such a task in a changing political climate. The constraint represented by the latter phrase is peculiarly evident to an educational planner today--more so than it would have been five years ago, for example, or even in 1968 when I gave that speech. So although I intended to speak about "needs" for the next ten years, and I shall refer to a set of tables which forecast some of the needs (tables which are contained in copies of my speech and which are also available at your seats so you can refer to them if you wish) first I wish to discuss some implications for the planner of the phrase "in changing political climate."

The planner, when he starts to prepare a set of projection tables for the educational decision-maker, works within a political and educational philosophy which is very real and is well understood by all concerned even though it seems to be vague and is certainly difficult to express. It is, in fact, sufficiently general to enable considerable inconsistency and variance to live happily together with outward harmony. Thus if you consult a group of educators you will find much agreement on the "aims" of education and the "aims" of the educational systems and institutions which they direct. On the level of gross generality, of grandiose philosophical statements, after some discussion, they will be able to come up with a text which all can reasonably accept as a statement of "aims and objectives." If you gather together a group of politicians who are responsible for making educational decisions, even when they are from different competing political parties you will, after some effort, be able to define the "aims and objectives" of education in such a manner that none would object to signing the statement.

With the group of politicians you might arrive at your final statement more quickly if you start formulating it negatively--it is easier to say what the intention is not, than what it is; in the same way as we find it less difficult to say when a person is not well--i.e. when a person is ill, than to pronounce him well. For example, few public figures would find it difficult to agree with the statement that "it is not the purpose of the elementary sector

of schooling to train specialists, it is rather the aim to provide children with basic literacy and numeracy, the ability to read, to write and speak their mother correctly, fluently and with some elegance and the ability to think in quantitative terms, recognize mathematical relationships and perform certain computations with understanding, accuracy and some speed."

But the planner cannot work with general statements of intent. He needs precise operational definitions and specific numbers. Even so, with some work, diplomacy and tact he can arrive at a satisfactory statement of "aims." One way of doing this is to map the present and the past, defining statistically the operation of the system under study. To the decision-maker then he can take this description and say, in effect, "However you formulate your 'aims' this is what in fact you are doing in the system for which you are responsible. Is this what you intend? Moreover, if you go on the way you are, assuming that this condition in the economy continues as it seems to be developing (or this condition in the society, or among population or however else you wish to recognize phenomena) this is likely to occur in your educational system ten years hence. Is that acceptable to you?"

In the resulting dialogue between the planner and the educational decision-maker the operational "aims" are defined and, moreover, the planning tolerance comes to be recognized. For example, it is not enough to say to the Minister of Education, as in effect in 1964 the Grade 13 Committee did, that by 1970 there probably would be 45,200 students in Grade 13 in Ontario (based on Dr. Jackson's prediction; There were in fact 48,173 in 1970/71) and so the central examination system must be changed, because apart from all the other criticisms levelled against the system it is expensive, it is unwieldy and it is breaking down under the sheer weight of numbers far greater than it was ever expected to serve. It was not enough, in 1963, to demonstrate this condition statistically to authorities who already knew the situation. Once the possibility of change was faced, the planner then had to try to predict:

a) What would be the effect on the academic standards of Grade 13 of destroying the examination system;

b) How the allocation and selection system for the transition from secondary school to university might use other tools (such as standardized tests or school marks);

c) What some of the resultant problems might be and how they could be averted;

d) How the student "flow" from grade 12 to grade 13 might be affected;

e) How this might involve a changed distribution of teaching manpower (particularly among subjects);

f) How this might affect costs;

etc. etc.

These predictions, which are to illustrate alternative feasible reform decisions, must be within a given social, political and economic context but even as they are being formulated the context is changing. And the reform to be implemented may take years to complete, certainly its repercussions will be felt for many years. And however careful the planning they cannot all be anticipated, and used or nullified.

What passes, in our society, for "common sense" or public general knowledge is constantly changing and no where is it in a greater state of flux than in education. For example: when my children were young, Mothers were strongly advised not to try to teach their pre-schoolers to read. Now television programs like Sesame Street and do-it-yourself books make every parent a reading specialist. We once thought the "proper age" to start reading was somewhere around six years, some psychologists now talk about teaching infants and toddlers. The reading controversy, which waxed hot about 6 years ago in Ontario, of the phonetic method vs. the look/see method (not primarily a controversy, between reading specialists let me add, and nowhere did argument rage so violently as in coffee klatches and Home and School Meetings) has now given way to the new initial teaching alphabet and individualized instruction, which admonishes that each child learns in a unique fashion, at a unique speed so that any "system" which is successful is the best system for him.

Well, you might argue, this type of pedagogical issue has always been with us. Wherein does it make predictions more or less difficult and wherein are changing political interpretations now placed on the predictions? Let us take this reading case--if the expectation is that all children above a certain level of learning aptitude should read to a certain level of efficiency by, let us say, approximately their 10th year of age, this can be accomplished in many ways: (a) you could argue that improved teaching is necessary and

require all present teachers of grades 1-4 to take special instruction; (b) you could decide not to try to directly improve the teacher force, but require all new entrants to teaching, starting next year, to have specialists reading qualifications if they wished to seek employment in grades 1-4 (thus upgrading the teacher force over a period of years according to the expected turnover rates); (c) you could leave the qualifications of the ordinary classroom teacher unchanged but provide special materials or special advisory personnel for her assistance; (d) you could leave the present teachers and the course of study unchanged but provide the pupil with greater reading "exposure" by assigning half the time of each day to reading instruction or halving the pupil/teacher ratio for reading periods, or withdrawing the children for short periods of individual reading instruction, or...I could go on suggesting other changes which might achieve the same purpose. The point I wish to make is that each such "production change" will have a different cost, will vary in terms of needed introduction conditions and lead time, and not least among the costs to be assessed are the "Political costs" involved. In general, one might say that the "political cost" of a change is in direct relation to the amount of "disturbance" it will create, the nature of the disturbance, its timing, and its incidence. It is very difficult, without strong statistical evidence predicting an even greater cost if reform is delayed, to persuade a political authority to effect a long term change which will begin to bear fruit only ten years hence but which has high immediate disturbance costs. By the time the benefits are reaped some other Minister or some other Board will gather in the political reward, but when the disturbance occurs this Minister or this Board will shoulder the political risk it represents.

At any point in time there are many public issues to be decided by public authorities. Governments cannot possibly tackle all policy questions at once. There is a sort of natural rhythm of development of an issue, and its importance can be recognized long before it becomes a common place topic for discussion. Part of the planner's work, as predictor, is to try to keep ahead of the game on behalf of the decision-maker to whom he is offering advice. One definition of a reliable projection is "A set of numbers which recognize and advocate the inevitable." The planner, therefore, has an important role as predictor--not simply as predictor of parameters and characteristics, (i.e. the traditional prediction of numbers of student clients, types of teachers, types of buildings, plant, equipment, materials, costs) but as predictor of the changing constraints,

(i.e. predictor of the changing myths and common-sense of educational policy and public policy).

In 1965 when the second report of the Economic Council of Canada was issued a great cry was raised encouraging "investment" in education--not as a public good, or a moral right, or a personal fulfillment but as an economic good to create economic growth, to develop wealth. In the cost benefit studies, the benefits of education were oversold. But the ensuing years were ones of affluence, high employment, rising productivity, inflation and rising public wealth. Because of the postwar baby boom and massive immigration, educational systems had to be expanded anyway. With, in addition, the mystique of social mobility through education and high earnings as the reward for high skills attested by formal education, the demand for places in educational institutions grew considerably beyond what might have been expected merely from population growth. The public investment of expanding the numbers of places in secondary schools and universities and colleges might have been made anyway. It might have been made under slogans of moral and personal "right." The fact that frequently it was justified by economic arguments of one sort and another neither makes those arguments right nor wrong, neither justifies the investment nor makes it a great mistake.

When the Ontario Minister of Education announced the creation of the CAAT system in the legislature in 1965 he justified it in manpower terms. "In this new age of technological change and invention, also, it is essential to the continued growth and expansion of the economy of our province, and, I suggest, of our nation, that adequate facilities be made generally available for the education and training of craftsmen, technicians and technologists...."[1] There was at that time a shortage of technical personnel. There had been for some years. Increasingly it was becoming difficult to buy these skills abroad by enticing trained immigrants to Canada. There was full employment in their own countries--particularly in the nations of north western Europe (Britain, the Netherlands, Germany, Scandinavia) which traditionally had supplied us with skilled and technical manpower. But the CAAT system need not have been "Sold" in manpower terms. It could just as well have been sold in social terms. If

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[1] Basic Documents, p. 5.

there had been serious unemployment in 1967 one could well have justified the creation of the CAAT system by the following hypothetical argument:

a) in 1965 after three years of the Robarts Plan's reorganization there was a cohort of 55,516 students finishing Grade 12 of Ontario's secondary schools. Only 75.9% of them were expected to enter grade 13.

b) this flow was expected to swell in the next five years to 67,605, 69,844, 76,135, 80,684, and 86,744. (Here I'm quoting a prediction of the Division of Educational Planning made in 1966 which might well have been used at that time--the actual Grade 12 figures of these years proved to be higher 70,625, in 1966 and 75,214, 82,371, 90,956, 98,837 thereafter). Absorbing this flow directly on the labour market would necessitate the creation of 42,234 new jobs the first year, 45,801 the second, 42,751 the third, 41,658 the fourth, 44,477 the fifth. With the then (1967) high unemployment rates it was unlikely the governments (federal and provincial) could stimulate the economy sufficiently quickly to create so many new jobs so that the already high youthful unemployment rate would likely be augmented.

c) One way of cooling off this youthful demand for jobs (an alternative form of unemployment insurance or welfare payment, if you like) would be to direct the student flow into a new set of tertiary level institutions and encourage youth to study relevant and vocationally useful programs. This would enhance their employability when they did hit the labour market a few years hence and would give government two or three years additional lead time (depending on the length of program) in which to try to enhance the capacity of the economy to absorb this labour.

Thus the same educational policy decision, the same level of "investment" of public funds, could have been justified by two directly opposite sets of arguments--both of which might well be true depending on the circumstances. One set of arguments would be appropriate in circumstances of acute labour shortage, another in circumstances of labour surplus. The problem is that the predictions specifying what is "needed" in educational policy (expressed in this case in numbers of technically qualified graduates occupationally defined) have to be made at one point in time, under one set of circumstances, but for a fairly long number of years ahead. Reasonable, even excellent, policy decisions based on such predictions can look reprehensible (or at best silly or deplorable) a few years later. It is the task of the planner to provide the predictions and make

policy recommendations in such a way as to make allowance for changed conditions and provide for revision of the planned change without too much political cost.

In years of rapid change of public attitudes it is very easy for one year's political "meat" (or maybe "gravy" would be a better term) to turn into the next years political poison. This is what is now happening in Ontario. The very achievements in educational reform and expansion, which once Mr. Davis could count upon as major political assets, now hang like an albatross about his neck in our "new" concern about educational costs. Between 1960 and 1970 under his regime as Minister and that of his predecessor Mr. Robarts (Mr. Davis became Minister on October 25, 1962) the survival ratio from grade 10 to grade 11 of the public secondary schools of the province as a whole rose from 80.9 to 90.5, for metro it rose from 81.6 to 100.0. During this decade the survival ratio from grades 11 to 12 in metro rose from 89.3 to 94.2. The improvement in completion rates which these figures represent was effected at a time when larger age cohorts were travelling through the secondary schools, anyway, because of population growth. This was a remarkable achievement but it was also an expensive achievement. When you push mass educational participation beyond the elementary level into the secondary school level you agree to provide a very expensive public service. There is no way it can be cheaply provided unless (a) its standards are so devalued that the old and the new cannot be compared, so that the new mass service is in fact a lesser service; or (b) such radical educational process changes are effected that very great unit production savings can take place. In the example quoted, the latter would involve the transfer of the responsibility for teaching away from a labour intensive process which uses large numbers of expensive teachers to one using other cheaper teaching/learning tools. But, unfortunately, with the exception of the traditional book, at present all the known substitutes for human teachers are expensive, and moreover by themselves they are ineffective. So far, they have been effective only when supplementing the human teacher--so they increase instead of reducing costs. An alternative process change intended to reduce costs might be to throw the responsibility for learning almost entirely upon the student and provide expensive teachers only sparingly for a learning consultation/diagnostic role rather than a specific instruction role. Unfortunately we don't know how to do this successfully, not with the mass of students we now serve with secondary schooling.

Let us look for a minute at what such a transformation of the secondary school means in pedagogical terms. Traditional secondary schools took the basic literacy and numeracy teaching of the elementary school and developed it academically. Adolescents were introduced to their literary and historical heritage, they were taught the beginnings of mathematical symbolic logic, they learned something of the fine arts and the performing arts, they were introduced to classical languages and literature and to the modern languages and literature of western Europe (particularly of France and Germany) and they began the study of the physical sciences. These schools catered to a very small number of working class children of high learning aptitude and the main stream of middle class children whose family conditioning and background had made them achievement-prone and easy to teach academic subjects.

The reform of the secondary school in the 1950's and 1960's transformed these academic high schools into institutions teaching a wide variety of theoretical and "practical" studies--the latter intended to reinforce and complement the former--on many more "levels of difficulty" than was previously the case, and to adolescents from homes which were representative of the whole community. These youths do not necessarily come from "bookish" families. They have not been conditioned to value academic achievement. Some will achieve as well as the middle class children who were the clients of the old schools, but not necessarily in the same areas of study, at the same speed, and under the same conditions. In fact, of course, this differentiated process of secondary level schooling is more expensive than the old academic programs. And so the actual success of the reform has created political risk because the degree of success is directly related to the degree of expenditure, and the expenditure has become so considerable as to be widely criticized.

But there is one prediction which I can make without fear of error and without contradiction: there is no way in which the social demand for formal education can be quickly dampened in Ontario in order to rapidly reduce educational expenditure, and there is no way educational process can be quickly and easily improved so as to dramatically reduce educational costs. To suggest other wise is a fraud.

That is not to say that reforms cannot be made in methods of financing educational services so as to spread the financial burden more equitably. Nor

is it to say that management reforms cannot be expected which will improve the "productivity" of educational institutions by requiring them to raise their standards of administration. But these topics I shall leave to Dr. Stager who is to give the next paper this afternoon.

What I am saying is that for better or for worse we have created a thirst for formal study. (I will not say "education" because that English word is fraught with overtones of "self fulfillment" and "regeneration" in addition to intellectual learning). The thirst for schooling satisfies many desires--ambition for higher earnings, ambition for social prestige, curiosity and inquiry, entertainment and recreation--and it feeds on itself. It is the well educated and the ambitious parent who demands longer formal training for his children. The more youths you provide with secondary level schooling, the more candidates you will have at the doors of your universities. Every Director of Extension or of Adult Education knows that with every course successfully completed there is an increased probability that the student will return for more courses. And the reverse is also true, every teacher engaged in Manpower Retraining Programs is aware that you cannot easily teach a worker new skills if he lacks a certain basic level of knowledge in language and mathematics, if he lacks a certain attitude which can best be described as the confidence that one can successfully learn something because in the past, one has already had the experience of successfully learning many things.

Before I direct your attention to the tables of projections which are provided, let me summarize what I have been trying to say about specifying future educational needs in a changing political climate such as we are experiencing today in Ontario:

1) All attempts to specify the future involve error and hence risk;
2) Nevertheless predictions must be made because the complexity of public policy decisions for educational service make the ad hoc decisions to solve immediate problems dysfunctional in that they create unforeseen new difficulties as they try to cope with old difficulties. Policy making in the public sector has become so interrelated--educational decisions affecting, and being affected, by immigration decisions, welfare decisions, financial decisions etc. etc.--that it is no longer possible to keep the forest from burning by spitting on the bush fires.

3) The planner when specifying future needs is engaged in an essentially conservative task. He must recognize the limitations of his work. He takes as given a whole set of process conditions which are changing. He takes as given a series of public attitudes, myths and assumptions which are changing. He must try to anticipate changing constraints imposed on the educational system by its society, particularly by its political climate, so that in minimizing present risk for the educational decision maker he does not thereby increase future risk.

Now, for a few minutes, let me speak of future (1980/81) numbers and conditions:

Education is a service to people. Its volume may be related directly to population size. Table 1 shows Ontario's predicted population by age groups. Note the continued drop in absolute numbers in the age group 5-13. This has been taking place since 1969 and is expected to continue until 1981. It will directly affect the elementary sector of the system (but we shall speak of enrollment presently.) Note the continued absolute increase in the age group 14-18 which is the clientele for the secondary school sector,[2] but the rate of increase drops sharply after 1970 and in absolute numbers there is decrease after 1978. The age group 18-21 is the reference group for undergraduate university studies, 18-24 if graduate and professional studies are included, 18-19 if one is discussing CAAT programs. These age groupings refer to direct youth flow at "normal progress" speed into what is referred to as the tertiary sector. For the next decade these are the age groups of continuous absolute increase.

The next group of tables contains enrollment projections. These are "demand for places" estimates based on student flows through the lower schools and survival trends in these lower systems (and in the tertiary institutions themselves) which are the result of educational selection, admissions and promotions policies and of public expectations. I have assumed that no dramatic change in public policy will take place. To be specific my estimates assume no sudden cut back in educational spending, for the simple reason that in my opinion, no Ontario government would "get away with" a dramatic cut back. It will be possible to shift spending from one sector to another (e.g. to spend more on the

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[2] 14-17 if we consider grades 9 to 12; 14 to 18 if we include Grade 13

CAAT system and less on the university system; or to offset an expected reduction in elementary expenditure by providing for an expanded pre-school service.) It will be possible to restrict the rate of growth in per capita costs by a variety of restrictive ceilings. But the enrollment figures shown here are, if anything, an under-prediction so there is no way in which total educational spending will sharply drop.

Tables 2 and 3 deal with the elementary school sector. This publicly-funded service already covers all the age group except for a very small number of children in private schools, hospital schools etc. The pre-school enrollment figures of tables 4 and 5 assume, by 1980, the provision of senior kindergarten service will be constrained only by geographical distance--i.e. difficulty of attendance. In 1970 these classes served 91.4% of the 5 year olds of Ontario. This estimate provides for 99.0% coverage by 1980 and a publicly funded junior kindergarten service to some 57.3% of the 4 year olds.

The percentage growth in secondary school enrollment in Ontario since 1955 has been quite unprecedented. In the next ten years absolute growth in numbers is also expected to be considerable, but further increase in participation rates is minimal (see Tables 6 and 7). In 1956 enrollment in grades 9 to 13 represented 52.3% of the age group 14 - 18 in the province; in 1970 it was equal to 78.3%, in 1980 it is expected to equal 82.1%. Absolute growth in enrollment over the decade 1970-1980 is expected to be some 111,605 (i.e. the expected 1980 figure will be 20% higher than that of 1970.) These figures exclude approximately 18,822 students who, in 1970/71, attended grades 9 and 10 of the publicly supported separate schools. If the current demands for public support for Roman Catholic students in private secondary schools, or for all students in private secondary schools (whether denominational or not) are acceded to, these enrollment figures will, of course, be much higher.

Projecting enrollment at the tertiary level is more tricky: possible choices of program and institution are greater, the student numbers are influenced by a large number of variables and may be manipulated by policy decisions made at the provincial level or by the individual institution. Tables 8-12 show three projections of undergraduate enrollment and one projection of graduate enrollment published by OISE in 1968. Unfortunately the revision of these projections is not yet complete so these are the most recent figures which I can

quote at present. For 1981 the estimated number of undergraduates in all Ontario universities (not only those which are publicly assisted) ranges from 181,598 to 232,118 depending upon the assumptions of growth. The estimated number of graduate students for 1981 varies from 47,144 to 35,919. The first figure assumes continuation of the rapid growth trend in enrollment in which we have recently experienced, the second assumes a considerable curb on the trend produced by restrictions on student aid and total university operating funds. The latter now seems more realistic, in fact it probably is too high. But there is a limit to how quickly enrollment growth can be curbed. The growth in numbers of university students obviously is extremely sensitive to the expansion of the secondary school sector which has been successfully carried out. Enrollment in graduate schools cannot quickly be stabilized if growing cohorts of undergraduates are flowing through the system--particularly if the employment situation is poor and many decide to continue their studies because they cannot find jobs. In such a situation, admission selection will become more rigorous.

University enrollment is also closely linked with the provision of other types of post-secondary educational service. In Ontario we now have 20 Colleges of Applied Arts and Technology offering full-time study of from 1 to 3 years duration to students drawn mainly from Grade 12 of the secondary schools. They also have responsibility for a great deal of part-time and full-time training of adults, manpower retraining, professional upgrading, and general adult education whose extent is difficult to gauge. Projections of full-time enrollment in this sector in the next decade are to be found in Tables 13 and 14. Table 13 shows a full time CAAT enrollment of 76,077 by 1981, more than three times the 1969 figure. This would be a service to the equivalent of 11% of the estimated age group 18-21. Table 14 shows projected full time first year CAAT enrollment as drawn from various flow sources--grades 12, 13, mature students, foreign students etc.

Tables 15 and 16 show projections of the number of elementary and secondary teachers needed to provide educational service to the expected number of pupils. These figures have been calculated using various assumptions about movement in the pupil/teacher ratio. This is the overall pupil/professional educator ratio which is negotiated each year with Boards of Education and which decides the size of the educational labour force. The "teacher" figures include

vice-principals, principals and relief teachers at the level of the school and consultant curriculum and resource personnel at the Board level but not what might be termed "senior administration" and not advisory services such as librarians, psychologists and psychometricians or social workers, attendance officers etc.

Table 17 gives a projection of the estimated number of special education teachers needed given various assumptions about the provision of their educational service, for which at present there is a considerable pent-up demand based on inadequate past provision of service outside the big urban centres.

A word of explanation about tables 15 and 16:

Projection 1 of Table 15 assumes a stable pupil/teacher ratio at the 1969-70 level. Projection 2 assumes that the ratio will decline 0.9 per year to 18.0 by 1978, and stabilize thereafter. Projections 3, 4 and 5 offer three targets with (a) and (b) parts reflecting the different manner in which each target is reached. In my opinion projection 4 is realistic for the last half of the projection period although for the next few years the ratio might be held steady (projection 1) because of concern about educational costs.

In Table 16, projection 1 assumes a stable ratio at the 1970 level. Projection 2 assumes an annual decrease to a ratio of 16.0 in 1973 which will stabilize thereafter. Projection 3 assumes an annual decrease to a ratio of 15.5 by 1980. Projection 4 assumes an annual decrease to 14.3 in 1981. In projection 5 the ratio is held stable until 1978 and then allowed to decrease slightly. And projection 6 provides for a slight increase in the ratio to 17.1 in 1972 and held stable thereafter.

The number of Special Education teachers required for special education in the elementary school sector was derived from three projections of special education pupils. Projection A assumes that by 1981 12.95 per cent of the age group 5-14 will be special education pupils. Projection B assumes that by 1981 9.97 per cent of the age group 5-14 will be special education pupils. Projection C is based on past trend of special education enrollment as a per cent of age group 5-14. (See Table 17)

Conclusion:

In trying to specify future educational needs in Ontario at this time there are some problems beyond those which the educational planner always faces. The question "How much should we spend on Education?" is a political question. It's obviously related to how affluent our society is when the question is being answered. If our economy is growing there will be less constraint on our public resources. There are many demands on the public dollar and some expenditures (such as an attempt to control pollution) are rising in popularity. That is not to say that expenditure on education is unpopular in an absolute sense--we have always exhibited a great public concern for education--but the public is asking some sharp questions about the continued rate of increase in costs and the efficiency of the service and the value for money on the investment. There will be a vast demand for places at the tertiary level and this service is the most expensive which we provide so inevitably we shall have to face the question of numbers and we shall have to try to predict part-time study,particularly at the universities and CAATs. How much of the expected volume of enrollment can be diverted to part-time study? What economy would we achieve in the year round use of plant? How many of the anticipated numbers of students can be accommodated in the same educational plant with more intensive use of premises by lengthening the "day", the "week" and the "year"? How many of the anticipated numbers of students can be trained with the same staff using the same premises by staggering study/work experiences in "sandwich" programs? What process changes can be realized quickly enough for general implementation in the next decade, which would enable us to process larger numbers of students for the same costs? When will we begin to get a pay-off from our investments in ETV, computer monitored instruction, and programmed learning? How quickly can we develop a process of individualized learning which would make a great many teachers unnecessary? (i.e. which would enable them to teach many more students with the same labour force. This seems particularly hopeful at the tertiary level.) How quickly can we differentiate the teaching force in all sectors so that there is a hierarchy of teaching skills (from very highly trained experienced "master teachers" and professor/scholars to a number of kinds of teaching assistants and teaching aides, many of whom might well be students themselves?) This would be one way of reducing total costs, particularly at the secondary level.

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